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OCULAR PROTECTION FOR LABORATORY WORKERS.

JAMES M. PATTON, M.D.

OMAHA, NEBRASKA.

Cases of ocular injury arising from laboratory experiments are cited. A collective investigation shows the relative frequency and importance of such accidents. The wearing of any glasses greatly reduces the danger from this cause; and proper protective goggles eliminate it. Experiments reported seem to show that safety in this respect can be attained by enforced wearing of such protection. Contributed from the Department of Ophthalmology, College of Medicine, University of Nebraska.

Mr. C. L. N., age 27, a third year student in the College of Medicine, University of Nebraska, was working in the chemical laboratory about November 10, 1924, when a test tube containing a mixture of sulphuric acid exploded. The contents of the tube struck his right eye, resulting in destruction of about four-fifths of the corneal epithelium with an extensive burn of the adjacent lower inner conjunctiva. The eye was promptly irrigated but in spite of this he suffered considerable pain and lost nearly two weeks from his class work. The corneal condition gradually improved and six months later the vision of his right eye without correction was 20/70; left 20/15—. The vision of the right eye was improved to 20/30 with correction and may in time become entirely normal, as there was very faint scarring just below the center of the right cornea which will probably become less. It was a very narrow escape to say the least.

Students are often supposed to be careless and are prone to disregard the precautions advised by the laboratory instructor. This can hardly be true in the case of Professor R., superintendent of schools in a neighboring city, who was testing a "critical tube" before demonstrating it to his class. The heating process was completed and the tube cooling when it exploded. It completely destroyed the vision of the left eye and caused a traumatic cataract in the right, which later developed secondary glaucoma. His vision is reduced to 4/200 with loss of the lower visual field and the ever present possibility of becoming totally blind. Serious injury would probably have been prevented in both cases had the gentlemen been wearing protecting glasses at the time of the accident.

As the results of these laboratory injuries coming to our attention with rather distressing frequency, it was suggested that we try to find out how often such injuries occur in the educational laboratories and what protective measures, if any, are being employed.

Inquiries were sent to two hundred University and College laboratories to determine the number of ocular injuries seen during the last five years, the number of cases in which the sight of one or both eyes was practically destroyed; whether injury was due to the effects of the chemical or to flying glass, were students so injured wearing any kind of glasses at the time of injury, whether protecting glasses or goggles were required and if so, the type found to be most practical. One hundred forty-eight replies were received, of which 80 reported no injuries of sufficient importance to mention. The remaining 59 reported a total of 129 ocular injuries with the loss of 17 eyes.

By far the larger majority of the injuries were due to chemicals; of the 17 eyes completely lost, 10 were from this source, 2 more from acid and flying glass, (82% in all) while only 3 were lost from flying glass alone. Of the schools reporting, in 47 the accidents were due to chemicals; in 3 to chemicals and glass (83%), 10 to flying glass alone. The close proportion between the destructive accidents due to

chemicals or chemicals and glass, and the total number of accidents reported is suggestive and impresses the fact that our protection must be primarily from caustic solutions and solids, and not limited to that which is sufficient to ward off flying missiles such as pieces of broken glass.

In only one of the 129 accidents reported was the student wearing glasses, and this was evidently of minor type, as no cases of serious loss of vision are reported from that institution.

There was no comment on some of the serious injuries reported, but the following quotations from other reports emphasize at least three things, viz., that explosions are in some cases unavoidable; that students as well as some of us who are more experienced are subject to lapse of memory or vigilance at which time thoroly emphasized warnings are disregarded, and finally that a real effort is being made on the part of some laboratories, thru printed warnings and the required use of goggles, to protect the eyes of their students.

(Note: Name of Universities or instructors can be supplied in case of further inquiries.)

U. of N. D.: "This year one of our students in Organic Chemistry foolishly stopped a gas train of apparatus generating ethylene, which was being absorbed in bromin. A wash bottle of sulphuric acid was also attached. The accumulated pressure charged some of the sulphuric acid over into the bromin and the resulting explosion threw the sulphuric acid into the young man's face causing, however, only superficial burns on account of the prompt treatment which he received. In this case, the fact that he was wearing glasses no doubt saved his eyes."

U. of W.: "A student thru disregard of directions partially lost the sight of one eye, being struck by a piece of glass when adding water to sodium residues in a flask."

U. of I.: "A storeroom keeper had an eye badly burned with sulphur di oxid due to the accidental escape of SO_2 from a valve of a drum. The cornea was burned to such an extent that cloudiness was produced which resulted in almost a complete loss of sight from the eye."

U. of M.: "One of the eyes of this student was burned with hot concentrated sulfuric acid, but after five or six weeks in the hospital the injury had entirely healed."

U. of K.: "In the case where the sight was lost the injury was due to glass. The student put zinc and sulphuric acid in a flask and then corked it. The pressure of the hydrogen broke the flask."

U. of I.: "I recall only two serious eye injuries, altho we have had many minor injuries due to gases and splashing of liquids. Working in a room containing vapors of dimethyl sulfat caused severe injuries to Mr. P. and Mr. G. The former had trouble for over a year, altho not so severe but that he could work. Mr. G. was in the hospital nearly three months, but I think finally his eyes healed. Mr. T. lost partial sight of one eye due to his burns of last year. Students were not wearing glasses. They are advised to do so whenever there seems to be any possible danger."

U. of T.: "Student lost sight of one eye due to getting solution of caustic soda in his eye."

U. of M.: "The one injury resulted from an explosion in the hands of a student other than the one who was injured. He was doing something which the students had been specifically warned not to do."

U. of C.: "Two or three minor accidents to students. None permanently injured. An assistant professor lost sight of one eye from flying glass. Professor was not wearing glasses at the time. (Cause of accident not given.) 'Warning to students;' Goggles should be worn whenever work under reduced or increased pressure is undertaken, and whenever, under any conceivable circumstances an experiment may lead to an explosion. Every research student and every student taking a graduate laboratory course is entitled to have in his outfit a pair of goggles for immediate use at any moment."

U. of P.: "Warning to students in case of accident: Eyes—if acid—wash with running water, and then bathe with lukewarm ½% sodium bicarbonat in eye cup. Dry with sterile gauze and drop several drops of olive oil into the eye.

If alkali—Wash with running water and then bathe with lukewarm half-saturated boric acid solution in eye cup. Dry with sterile gauze and drop olive oil into eye."

Y. U.: "One of our former students was injured just a week ago, and this accident has brought the question very much to our attention, so that we are now considering whether we should not insist that goggles should be worn while certain types of operation are being carried on. The accident which I refer to was caused by a stream of water accidentally getting into a vessel containing ether which was being dried by metallic sodium."

To determine the practical value of certain types of protection, the author made tests with fluids and with laboratory glassware exploded under as nearly working conditions as possible. Ordinary spectacles and various forms of commercial goggles were used.

In the fluid tests the glasses or goggles were placed on an assistant and about two ounces of water thrown sharply against the glass from a distance of twenty inches. An involuntary closing of the lids could not be entirely avoided, but even so we were able to form a rather definite opinion as to results.

Protection from ordinary spectacles is secured only when the line of force is directly against the surface of the glass. If it is above or below the fluid reaches the eye almost as quickly as if no glass was worn; even when it is a direct hit, the fluid trickles into the eye from the skin, but there is time to close the lids firmly before this happens. While the plain spectacle gives the least protection of those tested, it is infinitely better than none at all, even for fluids as the student is usually looking directly at the container at the moment of explosion, and the line of force is thus directed against the glass surface.

Four different types of goggles were used (See Figs. 1 and 2) in the tests with liquids. A, which is the least expensive, bought at a ten cent store, is as good as the best so far as protection is concerned, but is poorly ventilated and uncomfortable to wear for any length of time. B, gives excellent protection and a wider range of vision, but is bunglesome and expensive. C, with gauze or perforated sides gives excellent protection, tho not so good as the close fitting types. Perhaps the most practical of the styles, especially of those tried, is the socalled clip cup, (Fig. 2 A,) which can be used separately or be "clipped" on to the student's regular glasses. These fit closely and allow the student the benefit of his regular correction, and give double thickness of glass before his eyes.

In the explosion tests, sheep eyes were placed in the orbits of a dried skull. A three inch "flash cracker," placed in a six inch length of one inch heavy glass tubing, was exploded at from three to twelve inches from the eyes. The force of the explosion was sufficient to wreck a strongly made box of one inch pine, of about six cubic feet capacity which was placed over the equipment as a shield and would at least approximate the most violent explosions of the ordinary laboratory equipment as used by students.

Unprotected eyes were lacerated by the flying glass but in no case was the cornea or sclera cut thru. Goggles of most any type, if reasonably close fitting, are satisfactory. One light weight goggle lens was broken by the explosion; and a lens of "nonsplintering glass" was partly shattered, but did not break when a charge was exploded within three inches of the glass. Fig. 2.

In each instance the lens surface was scratched by the flying glass, but the cornea was protected, proving conclusively the protective value of goggles when flying glass is to be considered.

We are at present testing a laminated optical glass which shows possibilities of protection. Fig. 2 (B), at the left, shows the heavy glass of a

clip cup goggle shattered by the bullet from a high pressure air rifle. The regular spectacle underneath the clip cup, however, was uninjured by the bullet. On the right is shown the laminated glass struck by a bullet from the same distance. The glass was cracked but not splintered. If this glass eventually proves to be optically satisfactory, it will be an ideal form of lens to use in all cases where the patient has but one good eye, or where the occupation exposes the wearer to flying missles of any sort.

Eighteen schools reported as to type of goggles used. Of these, 7 used an inexpensive type with clear glass and wide leather margins; 6, ordinary motor goggles with wire or gauze protecting shield; 1, goggles with special heavy lenses; 1, electric furnace goggles, another a felted type with springs to take up impact. Only one is using a nonsplintering glass of the aeroplane type, but two others are investigating this form of protection.

Some of the schools seem to be making an intelligent effort to protect their students while working with dangerous materials; as indicated by types of protective apparatus provided, and carefully prepared printed cautions to be observed while making experiments and first aid procedures in case of accident. Others supply protection, advise the students to use their goggles, but do not require it; while a number make no attempt to provide protection. One department head was inclined to treat the matter rather lightly on the ground that accidents were infrequent, and could be guarded against by care in handling reagents. His attitude is that of the shop foreman of 15 years ago who objected to safety first measures; if directions were always carefully followed, accidents would rarely occur, but students sometimes fail to understand, are inexact or careless, or are inquisitive and "want to see what will happen." The supposedly harmless mixture explodes without warning, and their goggles have come too late.

Most of the schools reported that goggles are provided or available but not required. Thirty-eight schools where accidents occurred neither advised nor required that goggles be worn, while in schools where no accidents were reported, 67 advise that goggles be worn while 22 do not. In 26 schools where one accident in each school was reported, 8 advise that goggles be worn and 18 do not. In 14 schools where two accidents each were reported, 9 advise and 5 do not. In 18 schools of 3 or more accidents, 8 advise the goggles and 10 do not.

While there can be no argument against the value of a protective goggle at the time of accident, it is evident from the above that simply *advising* their use while performing experiments in which there is a possibility of danger, is not sufficient. To adequately protect the eyes of the students the wearing of goggles must be *required in all experimental procedures, and the requirement enforced.* Again referring to the shop men when the agitation for compulsory protection was first urged: the men objected that the goggles were hot and uncomfortable, soon got dirty and cut down speed and accuracy in work. Foremen said they couldn't get them to wear them, and the employers often thought it an unnecessary expense to provide protection, arguing that if the employee didn't have sense enough to protect his own eyes, why should they worry.

Now thru demonstration and safety first contests for the men, education and responsibility for safety conditions on the part of the foremen, and a definite financial liability placed on the employer thru our various state compensation acts, protection has become almost universal and the number of industrial injuries to the eyes has been enormously reduced.

The same degree of protection can be secured for our students. A properly selected comfortable set of goggles should be allotted to each worker. Careful explanation of the necessity for protection and rigid discipline on the part of the laboratory director, with suitable penalties for failure to comply with the rule, should be part of the regular program, and as example is a most valuable teacher, the laboratory director should wear goggles when

demonstrating and avoid the tragic experience of the assistant professor in the U. of C., and of Prof. R. mentioned above.

The argument has been raised that considering the large number of students involved, very few of them get hurt. Fortunately this is true, but from our replies at least 17 lost the sight of one or both eyes, 112 were seriously injured, not to mention the many minor injuries and "narrow escapes" any one of which might have resulted disastrously, and speak for the necessity for protection as surely if not as convincingly as tho the sight had been lost. Even tho the schools are not financially liable for injuries sustained in laboratories, they have a moral responsibility which is none the less exacting, and the school which fails to compel its students to make use of so simple a means of protection as goggles, is falling far short of its just responsibility.

600 Brandeis Theatre Bldg.

EYEDNESS AND HANDEDNESS.

LLOYD MILLS, M.D., F.A.C.S.

LOS ANGELES, CALIFORNIA.

The tendency to lateral asymmetry in man extends to the functions of the eyes and hands. The dominance of the right or the left eye and greater facility of using the right or left hand are designated as "eyedness' and "handedness." The latter may depend upon the former. In any case the relations of one to the other are interesting and of practical importance in the treatment of ametropia and defects of the ocular movements.

It is always apparent in the examination of two eyes which are exactly alike in manifest and retinoscopic findings, that one possesses a greater sense of clarity, sharpness of outline and detail and, in general, a greater power and refinement of discrimination. Such dominance is absolute, for of the two eyes only this master eye sees objects in their true place, while the impressions of the other eye are suppressed by, or lost in, the clearer images of the prevailing eye; save for those parts of the visual field which, from their position, are seen by the weaker eye alone. These, in turn, are transferred upon the dominating eye in such a manner that we imagine that we are seeing thru the prevailing eye all that we see only by the weaker eye, of whose cooperation we are, however, well aware.

This bilateral asymmetry of function is limited by no means to the eyes but is so uniformly present in all the paired organs of the body, in the skeletal and muscular structures and functions, in dermal and muscular sense and in all the special senses, as to force the recognition that asymmetry of structure and of function is a basic condition of the human body in its present stage of evolution.

Noses are seldom straight; the left helix is apt to be lower, better developed and more prominent than the right; the tongue seldom can be protruded in a straight line; and in few, if any, faces is there evenness of muscular action in the execution of those grimaces known as smiling, winking or raising the brows. Asymmetry of the skull and of its sutures is universal and is one of the anthropometric guides in the identification of human skulls. The skull, in fact, is now being considered as a great terminal vertebra, which assumes compensatory postures in the case of postural defects original in the extremities and spine, and gravitational postures due to its own imbalance on the spine, unless fully balanced by compensatory spinal curves. The center of gravity of the whole body is to the right of center in the right handed, as a sum total of all these structural differences; and this so affects orientation as to cause one to run, row or swim in a circle if there are no guiding landmarks. In fact one of the functions of officers in the early armies of the World's history is said to have been that of preventing the whole body of troops from moving to the right. Diseases of arrest or defect are more apt to be left sided in the

brain, as well as in the skeleton, muscles and symmetric viscera, among the dextrous; and involve the right side more often in the sinistrous.

It is probable that the race of mankind began with symmetry of form and of function, if we may judge from the freely controlled and equal function of the four extremities in quadrupeds, from the quadridexterity of all primates save man and from the bilateral symmetry of form and function seen in early infancy. True ambidexterity is rare and when present is considered as atavistic, particularly as it occurs mainly among primitive races and among feeble minded. The acquired ambidexterity which has resulted from training the lefthanded to a certain degree of righthanded facility is, in the main, merely the acquisition of a greater or lesser degree of bimanuality, in its restricted sense. It has been determined, that onesidedness, and particularly dextrality, is of the greatest advantage to mankind, up to its present stage of development.

It is probable that there are great selective advantages, particularly in the concentration and steadiness of muscular control, in the simplification of the neuromuscular arc and in the reduction of the quantity of mental inhibitions by the comparable reduction of association paths, which is gained by locating some functions mainly in one or the other hemisphere and others mainly in the right. Thought is conceived by the brain, formed by the eye and executed by the hand; and that perfect coordination of mind, eye and body which enters into the performance of all combined bodily movements, especially during games, would appear to make the placing and habitual fixing of control on one side of the body almost a necessity. Stanley Hall (Mind, 1884, Vol. LX, pp. 93-109) says: "It is not impossible that there is some systemic advantage to self-consciousness, or double dealing with ourselves, in the predominance of one side over the other, or even in the act of somatic duality."

In the lower forms of the animal world the neural decussation is so complete and the visual axes are so divergent that there is no common visual field. Each eye serves to protect and control the corresponding side of the body. In the higher forms of animals binocular vision is associated with some form of lateral sighting. Among the apes and occasionally in ambidextrous man this sighting faculty is not fixed but fluctuates laterally according to the position of the visual stimuli on the right or left. It is common knowledge, of course, that the congenitally blind show little tendency to handedness. With but few exceptions the human race has acquired the faculty of fixed unilateral visual and manual dominance and this probably arose when man made his first attempts to create weapons and tools and required a holding hand and monocular sighting, in order to do away with the double images which otherwise would be constant and inevitable with direct and equal binocular vision.

Parson gives these theories and their underlying experimental basis in detail in his recent book "Lefthandedness." (Macmillan 1924.) A. Duane (Archives of Ophthal., May, 1925) confirms and elaborates Parson's conceptions independently. In view of the interest created by Parson's work it will be of bibliographic interest of least, to note that Majewski (Postep. Okul., 1903, No. 9) abstracted by C. Zimmerman in Ophthal. 1, No. 2; 337-338, Jan. 1905, following up Hering's, Javal's and Rosenbach's observations upon binocular vision by simple fixation tests, showed that sighting was mainly a monocular function, and that the right eye predominated in sighting. He concluded that "in the great majority of people there is undoubtedly, aside from normal binocular vision, monocular vision subserving binocular vision, greatly insuring the precision and accuracy of visual projection." Had Majewski applied this first definite statement of unilateral sighting to the problem of handedness Parson's book need never have been written. Parson, however, carried the matter to the logical conclusion that sighting, along the line of righteyed vision in the righthanded and of lefteyed vision in the

lefthanded, was the direct instrument in the production of handedness.

It is still somewhat speculative as to why dextrality rather than sinistrality is the dominant condition of man. Undoubtedly, as Parson suggests, there was a time when right and left eyedness and handedness were equally distributed. The protective and offensive demands of primitive warfare and manual usage in religious rites and gesture language probably were the means, active over a long period of time, in gradually fixing the dominance of the right eye and hand. Nearly all purposeful manual movement is directed by vision and inasmuch as the "functional limitation of binocular vision forces the exclusive use of one eye in sighting, naturally the hand nearer the sighting eye would be chosen, as speed, accuracy and economy of effort" would dictate.

The right hand appears, from the dawn of history, as the sword and spear hand, the hand of throwing, greeting, oath taking, blessing and writing. It was associated in religious rites with gods, with the sun and with good omens. The left, or sinister hand, save only in China, where it is the hand of honor, bore the shield, performed all the unclean acts and was associated with demons and shadows, with ill luck, sinister influences and inauspicious auguries.

The left eye, like the left hand, was also considered as the drudge, or ocular Cinderella. Even at so recent a date as 1623, the interesting "Work on Spectacles" of Benito Daca de Valdez, printed in Seville and resurrected by Casey Wood, bears an engaging wood cut of a pair of spectacle frames, from the right cell of which an ardent sun warmly beams in all directions, while a sad faced moon retires into the cloistered left cell.

Many other interesting but unconvincing theories have been evolved to explain eyedness and handedness such as that of Stevens and Ducasse (Psychol. Rev. 19, No. 1: 1-31, Princeton, N. J., Jan. 1912) who found that the right half of the visual fields of both eyes were overestimated. They argued that this bilateral sensory asymmetry, being associated with greater activity of the left brain, was the source of the current of innervation which eventually produced movements of the right hand and arm. They based their opinion upon the fact that fully 90% of all the movements, not instructive, which are made in the plastic state of infancy, are done in response to visual stimuli. The right object, by appearing to be the larger would make a stronger claim upon attention, and the practice and habit of the right-handed movements which ensued would make the reaction inveterate. As this study was made with adult subjects, its conclusions are open to the criticism, that the overestimation of the right visual fields might have resulted from the matured righthandedness and righteyedness, instead of the reverse.

Every child seems to be born with the capacity for using either hand with equal freedom. Onehandedness comes with use and experience, associated to some extent with hereditary and with compulsory and educational influences. One definite factor must be the position of the two eyes, placed from 50 to 65 mm. apart, which necessarily makes them see two different pictures of all objects, one of which must be chosen and the other neglected or suppressed. The right foot and hand have been directed by the right eye, from primitive times, and the left hand and foot by the left eye. This is apparent if we attempt to execute accurate motions with the right hand while we close the right eye and look with the left eye. Accordingly, dextrality and dextro-ocularity are inevitably correlated, as are sinistrality and sinistroocularity.

Lefthandedness is more common than generally is supposed. Various authors place its incidence at from 4 to 27% and my own data, given later, place it at not less than 20%. Such a figure would mean the colossal total of over twenty-four million essentially lefthanded persons in our own country alone. The majority of the reported statistics, like those of Steir (G. Fischer, Jena 1911) who found 4% of

sinistrals among 266,000 German recruits, are undoubtedly much too low; for they include only the frankly sinistrous and wholly neglect that large group of lefthanded persons who become righthanded, or bimanual, by that often unrecognized but effectual compulsion and training in infancy and youth, which gives to the right side a relative monopoly of motion and purposeful movement.

Gould (Biographic Clinics 111, ch. 9: 341-359: Blakiston's Sons & Co., Phila. 1905) ascribes the origin of sinistrality in large measure, to the location or education of the speech center in the right brain because of injury to dextral organs, but chiefly to disease or deficient vision of the right eye. If such conditions ever were causative they are but minor factors in the present day. Many of my cases of pure lefthandedness have equal and normal vision in each eye, and some actually have poorer vision in the fixing eye. I have noted that lefthandedness is so prevalent in families, however, that I cannot escape the impression that its persistence, in spite of almost savage attempts to make dextrality a racial issue, is due to its heritable quality. Judging from the numbers of lefthanded individuals who appear in families, sinistrality is probably a genuine Mendelian characteristic, which appears and disappears in family lines according to the amount of mating between pure or crossed (obscured) sinistrals and pure or crossed dextrals. Data which I shall give presently definitely bears out this assumption which has been the belief of previous investigators such as Jordan, Parson and others.

I found, several years ago, during a study of "The Effects of Faulty Cranio-Spinal Form and Alignment Upon the Eyes" (Amer. Jour. Ophthal., July 1919) that dextrality, aside from its recognized connection with a dominant right eye and a cyclophoric left eye, often is associated with more or less left hyperphoria and with characteristic divergence of the left eye when a suitable test object is brought nearer than the convergence near point. The reverse exists in sinistrality. This divergence occurs much less often when esophoria for near is present, but even an eye which is convergent, to the point of actual strabismus may follow the rule and become the divergent eye during this test, under the influence of this onesided mastery. This important test in determining the relation of eyedness and handedness depends upon monocular sighting and, unlike distance tests, is apart from voluntary control save in marked esophoria. The subject as a part of the routine eye examination is made to fix without effort the aperture in a plane ophthalmoscopic mirror held about two feet distant. The mirror is brought steadily forward in the median line, or in doubtful cases in the line of the right or the left eye, until the convergence near point is reached, where the nonsighting eye diverges more or less sharply. The test is always definite and striking where there is exophoria. But where there is much esophoria and the patient is nervous or fixes very intently, it may be necessary to repeat the test several times before positive results are secured. In some doubtful cases, holding the mirror at the point of maximum convergence for a second or two tires the adductors of the moving eye and they suddenly relax, the eye swinging out at once. In some persons, however, an uncertain result is cleared up by determining the cyclophoric eye, which is so nearly always the nonfixing eye, that a test for cyclophoria may be considered as an almost infallible test for ocular dominance.

We have means, therefore, in the ophthalmoscopic mirror, Maddox rod, rotary prism and Stevens' clinoscope which put the determination of eyedness, and consequently of handedness, almost beyond the question of doubt. The accuracy and practical value of these instruments, as compared with that of the newly introduced manoptoscope of Parson should be rigidly tested, as tests for ocular dominance are bound to become part of the fixed routine of eye examinations, and the simplest and most accurate means of determining the facts should be ascertained and made available as soon as possible.

So many exceptions were found to

the general rule that dextrality was associated with dominance of the right eye, that I made an attempt to explain these exceptions. No satisfactory solution was given by plotting the minor differences between the eye along the lines of refraction, rotary motility; or in differences in far and near points or size of pupillary aperture or accommodation. It was soon evident that the origins were usually coarser and were cerebral rather than ocular.

In general, people were found to fall into the groups of pure or crossed dextrals and sinistrals. In the pure dextral there is righthandedness and the right eye is the master; vertical orthophoria or minor degrees of left hyperphoria are the rule; there is more or less obliquity of axial inclination of the left globe and the left eye diverges more or less sharply, when the test object is brought inside the convergence near point. In the pure sinistral the left eye is the dominant; vertical orthophoria or minor degrees of right hyperphoria prevail; the right eye is cyclophoric and this eye diverges inside of the convergence near point.

In the crossed dextral there is righthandedness but the left eye is the master and the right diverges inside the convergence near point. These cases are nearly always fundamentally lefthanded, but reversed by early training. The crossed sinistral is lefthanded, but the right eye is the master and the left, or rarely the right, diverges inside the convergence near point. This is much the rarest combination. The vertical balances of the last two forms follow no fixed rules, and the history often is obtained of injury to an arm, or of ocular disease or injury which explain the modification in ocular or manual dominance.

We merely emphasize, in using the term "lefthandedness," the most evident expression of the psychomotor mastery of the right brain over the left, a mastery which extends over the complete left half of the body, unless modified very early in life by training, compulsion or by the effects of injury or disease. Consequently in dextrality acquired by early training, it is common to find righthandedness so thoroly established that only a few simple movements are done masterfully with the left hand; but the left eye remains the master and the right diverges inside the convergence near point. Left hyperphoria occurs more often here than in the pure sinistral, because of the long left lateral scoliosis which has accompanied the righthandedness, and the typical drag down of the right shoulder with its effect upon the position of the head.

In five different series of two hundred cases, which included the current run of ophthalmic cases of all kinds, I found an average of pure dextroocularity in 76%; crossed in 13%; pure sinistroocularity in 9.3% and crossed in 1.7%; which would place the total group of lefthanded at over 20%.

A history of the acquisition of righthandedness or ambidexterity by training was obtained in about half of the crossed dextrals, and in about half of the rest some residual effect of an inherited tendency to sinistrality remained, such as batting, or sweeping, or wringing clothes with the left hand. Considering all these cases as fundamentally lefthanded, we would have the ratio of right to lefthanded as 3:1, which is an exact Mendelian ratio, assuming with Jordan "that lefthandedness acts in inheritance as a Mendelian recessive." A clear history of familial lefthandedness was given by 26% of the lefthanded groups; a percentage which certainly would be much increased if it were the custom to know anything of the traits and tendencies of the average family for a period of more than two or three generations.

The conditions which would be supposed to modify ocular mastery usually produce the expected modification. Ulcers or injuries of the cornea, for example, which have left severe scarring in early childhood, and disease or injury of the lens, retina, macula or choroid, occurring congenitally or early in life, are likely to throw the mastery to the unaffected or to the less affected eye, if associated with much loss of vision. Again, where high astigmatism exists in one eye, this is almost certain to be the eye which

lacks dominance and nearly always is related to the side of the body which has the poorer function. Exceptions to this general rule are not rare in myopia where, at times, the sighting eye yields first and to a greater degree than the moving eye. In nine out of eleven consecutive cases of conical cornea, the first evidence of the condition appeared in the eye which lacked the mastery and which was on the weaker side of the body. Nine of these cases were righthanded and two were sinistrals. In eight cases the progress of the condition had become marked in the nonprevailing eye before the cornea of the dominant eye showed much change.

The mastery of sinistrality or of dextrality very often persists in spite of decided structural differences in favor of the nonprevailing eye. It is by no means rare, for example, to find hyperopes with a vision of 6/20 in the right eye and 6/7 in the left, who fix with the right eye and whose left eye diverges inside the convergence near point. This visual difference was more extreme in a righthanded myope, whose right eye maintained the mastery both for distance and for near, in spite of 4/60 vision in the master eye and 6/7-2 in the left. The fact that this patient had worn glasses from the time when defective vision was recognized in early childhood, probably was responsible for the maintenance of this mastery. Such an observation and comment opens an unrecognized subject of much possible significance, both as to vision and general nervous effect, in considering the value of early correction of visual defects by lenses, especially in the myopic conditions. Parson sums the advantages gained by maintaining natural dominance as follows: "Eyedness, handedness, speech and writing are controlled from contiguous areas in the same half of the brain" and change or interruption of this direct relation definitely slows and disturbs "the most direct and speedy coordination of sight impressions with intellect, will and action."

Roderic O'Connor, in a recent letter, voiced the experience which all who do much ocular muscle surgery must have had, "I once thought that in cases of insufficiency of convergence the nonsighting eye ought to be the one to fail to converge, and believed that any operative work should be done on its internus. But studying a number of cases along these lines failed to support the idea." Possibly modifications of dominance may explain the behavior of some of these cases. Again, in the matter of prismatic corrections for deficient convergence, it has been the custom to place the whole amount of prism before the nonsighting or moving eye, if of small amount. It is also the custom, and I believe the correct one, to make the correcting lens of the nonfixing eye carry the larger amount of prism when heavier corrections are required. There is a binocular impulse to converge in these cases, of course, but in the moving eye the stimulus to converge is not compensated by the balancing innervation to its external rectus, as is the case in the sighting eye. Dolman has also pointed out the necessity for placing the Maddox rod before the moving eye, in order to obtain accurate data as to the heterophoria, lest if placed before the master eye the weaker image be suppressed.

It is evident, from observations made upon several thousand persons during the period of this inquiry, that when the special paths of binocular control and monocular mastery once are established, they are not likely to be modified after adolescence by any disease or injury, which still permits vision of approximately 6/20 in the affected eye. The age at which this dominance is fully established is not yet known but manifestly it is subject to wide variation. R. Neurath (Wiener klin. Woch., 1922, p. 895 and ibid, Feb. 21, 1924, pp. 187-8) reports nine cases of righthanded children and young adults, who had become secondarily lefthanded as the result of paralysis, caries of the elbow or battle injuries forcing amputation. In all of these patients, none of whom gave a family history of lefthandedness, the muscles of the left face dominated or equalled those of the right in power, and winking was done better, or as well with the left eye as with the right, characteristics of essen-

tial lefthandedness. One child invariably used the left foot in playing football.

Unfortunately, Neurath made no tests to determine ocular mastery; but in recording the ocular muscle action of a number of children of all ages who have suffered from infantile paralysis, spastic conditions and ankylosing injury or disease of one elbow, I have found the ocular mastery unaffected. Recently I saw a child four years of age who sustained a birth paralysis of the right arm which disabled this arm for over eight months. The child still is lefthanded and leftarmed, but the right eye is the master eye; the left diverges inside the convergence near point and is cyclophoric; the right eye winks the better and the right leg has the mastery. This case proves that the type of case reported by Neurath at least has its exceptions.

One righthanded patient fixed with the left eye and the right diverged under the near test. There was ½° of right hyperphoria, and the vision, without correction, was 6/7-2 and 6/6-2. I commented to the man that he should have been lefthanded, but he accepted the comment as a pleasantry. Three months later he returned with the special object of telling me that after he had repeated my "joke" to his mother, she had informed him that, as a young child, she had had to tie his left hand behind him for over four months before he was "broken" of his lefthandedness.

Another case, a girl, aged 20, who fixed with the left eye and whose right diverged in the near test, was lefthanded but also was "broken" of this when so small that no memory remained of the period of reeducation. Her vision was 6/6 in each eye and in this connection it is surprising, in examining a large number of persons from the standpoint of the relation of visual acuity to ocular dominance, to find how comparatively little a part anisometropia actually plays as a causative factor. Instead, the usual differences in ocular position, structure and, consequently, the usual differences in visual function are the local evidence of the condition of generalized one-sidedness and may be considered as original or causational local phenomena if the theory of eyedness and handedness proposed by Parson is confirmed. It is almost trite to remark that where one eye is hyperopic and the other myopic, the former usually dominates for distance and the latter for near. Such cases are not the ordinary run, however, and are mentioned merely to show that anisometropia may be an occasional factor.

My most marked case of crossed sinistrality occurred in a woman aged 42, who was frankly lefthanded and who had normal vision in each eye. She fixed with the right eye and this same eye invariably diverged sharply when the test object reached 3 inches from the nasal root. There was right cyclophoria, proving a basic lefteyedness. This combination of actions is exceedingly rare. There was no known history of injury, which could be used to explain this combination of actions.

My records show many cases where the nonfixing eye was the first to change its shape under visual effort, and was the first to show beginning presbyopia. Changes in refraction often begin in this eye, before presbyopia is an established fact, as a sort of prepresbyopic relaxation.

In recent severe industrial injury, even where decided visual defects, short of industrial blindness, result, the neuromuscular mechanism of dominance still functions inside the convergence near point; and the injured eye nearly always will maintain its normal muscular behavior under such a test. This behavior often is noted years after injury; and may reveal the fact that an injured eye was the master, when no other means of information to that end are available.

Finally, mention must be made of the importance of maintaining ocular mastery in the correction by lenses of the myopias, and of mixed astigmatism particularly, where giving the mastery to the nondominant eye is likely to cause anguish both to patient and to physician.

SUMMARY AND CONCLUSIONS.

I. One eye always possesses a greater sense of clarity and power of discrimination, even when both are alike in retinoscopic measurements and in manifest acuity. The right eye is usually the better.

II. This asymmetry of ocular function is part of the general asymmetry of structure and function, which, in its most prevalent form of right-handedness, seems to be of the greatest advantage to mankind in its present state. Onesidedness is probably most effective thru simplification of neuromuscular control and of inhibitions.

III. Eyedness develops in connection with and determines handedness, the line of vision of the eye chosen as the fixing eye regulating the matter of the dominance of the corresponding side of the body which it guards and controls.

IV. The clear history of familial tendency to sinistrality in 26% of left-handed people and its incidence in over 20% of all people, bear out the explanation that lefthandedness persists as a Mendelian recessive, in spite of racial training to eradicate it.

V. There are four groups of dextrals and sinistrals:

1. The pure dextral is righthanded. The right eye is the master eye. The left eye is cyclophoric and diverges when a test object is brought nearer than the convergence near point. About 76% of all people are pure dextrals.

2. The pure sinistral is lefthanded. The left eye is the master and the right is cyclophoric and diverges in the near test. About 9.3%.

3. The crossed dextral is right-handed (usually by training) but is lefteyed. 13.0%. The right eye diverges in the near test.

4. The crossed sinistral is left-handed but the right eye fixes and the left eye usually diverges, tho the right may diverge. 1.7%.

VI. The use of the plane ophthalmoscopic mirror in determining the eye which maintains fixation inside the convergence near point and, in doubtful cases, of the Maddox rod, rotary prism and of Stevens clinoscope to show the cyclophoric eye, are almost infallible in determining eyedness and consequently handedness.

VII. The characteristics of these groups are modified early in life by injuries or diseases which greatly reduce vision in the master eye. After the pathways which produce ocular dominance are fully established, mastery may persist, however, in spite of great loss of vision in the master eye. The early use of lenses may maintain this dominance, with its great visual and nervous advantages, even where vision is as unequal as 4/60 in the master eye and 6/7 in the nonprevailing eye.

VIII. Conical cornea seems to appear first, more often in the eye which lacks mastery and which is on the weaker side of the body. It often becomes marked in this eye before the dominant eye suffers much change.

IX. Anisometropia plays relatively little part in causing ocular dominance. The usual differences between the eyes in position, structure and resulting vision are the local evidences of the condition of generalized onesidedness. Assuming the correctness of the theory that handedness follows eyedness as the direct result of monocular mastery, the differences noted in ocular position, structure and in vision may represent original and causational local phenomena.

X. Ocular mastery should be maintained with care in the correction of errors of refraction and particularly of the myopic conditions.

609 So. Grand Ave.

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SARCOMA OF THE CARUNCLE.

J. G. DORSEY, M.D., and W. G. GILLETT, M.D.

WICHITA, KANSAS.

Most reports of sarcoma of the caruncle have been incomplete as to clinical features and in only 18 was the diagnosis verified by histologic findings. These verified cases are reported in tabular form with the details of a new case observed by the writers.

Sarcoma of the caruncle is extremely rare; only eighteen cases with verified histologic findings are reported in the medical literature and this is the first large collection ever made.

From the accompanying outline it is plain to see that most of the reported cases are incomplete especially regarding the recurrence of the growth and the life of the patient. However, sarcoma of the caruncle is similar in its evolution to malignancy of this type elsewhere in the body, and systemic as well as local recurrence is the rule. Locally the growth spreads slowly, by contact adhesions to the surrounding structures, conjunctiva, skin, globe and orbit, but seems to have a special preference for the sinuses. Of the sarcomas of the caruncle by far the majority are melanotic, twelve of the nineteen cases being pigmented. One rather characteristic point regarding the pathology of sarcomas of the caruncle is their very abundant vascularity, some being so interwoven with blood vessels as to merit the name telangiectatic and angiosarcoma. By referring to the outline the age incidence, sex, side, etc., can be found; unfortunately not every case record was complete in these respects.

REPORTED CASES OF SARCOMA OF THE CARUNCLE.

Cases reported by	Year Pub.	Sex	Age	Side	Size	Type of Sarcoma	Recurrent	Remarks
v. Graefe	1854				Hazelnut	Fusocelled sarcoma	Not stated	Alive at publication
Gilletti	1873			R.	Very large	Melanotic sarcoma	Yes, five times	Alive at publication
De Fourmeaux	1873	M.	55	R.		Sarcoma	No	Died four days after operation
Rydel	1875			R.	Pea	Melanotic sarcoma	Yes	
Snell	1877			R.	Walnut	Melanotic sarcoma	Yes	Died one year later
Del Monte	1879	Cld.		R.	Walnut	Telangiectatic fibrosarcoma	Not stated	
Despagnet	1888	F.	30	L.		Nonpigmented sarcoma	Not stated	
Meighan	1892	M.		R.	Hazelnut	Melanotic sarcoma	Not stated	
Veasey	1897	M.		R.	Green pea	Nonpigmented sarcoma	Not stated	
Pflueger	1898	M.	60		Small	Melanotic sarcoma	Yes	
Rumchewitsch	1902	M.	22			Melanotic sarcoma	Yes, one year later	
De Berardino	1902	M.		L.		Melanotic sarcoma	Not stated	
Ludvig (later reported by Emmanuel)	1902 1908	F.	30	R.		Pigmented fibrosarcoma	Yes	Died in two years
Ceppi	1902	M.	5			Telangiectatic fibrosarcoma	Yes	Died in a short time
Bert	1902	M.	72			Mixed celled pigmented sarcoma	Not stated	
Koenigshofer Lepman*	1903			R.		Angiosarcoma	Yes	
Bock	1905	M.	24	L.	Small Spot	Melanotic sarcoma	Not stated	
Stoewer	1812	F.	25			Sarcomatoid degeneration of nevus	Not stated	
Dorsey and Gillett	1925	F.	43	R.	Pinhead	Melanotic sarcoma	No recurrence	Alive after two and one-half years

* Koenigshofer and Lepman state that in Koepple's inaugural dissertations (Halle 1898) there were 35 cases of primary sarcoma of the conjunctiva bulbi collected and in only two of these was the caruncle the point of origin. Unfortunately the histologic records of these two cases are unrecorded and have therefore, not been listed with the above verified cases.

CASE REPORT.

Mrs. E. W., white female, age 43 years. Her general history and physical examination are entirely negative. We saw her first December 11, 1922 at which time she gave the following history. Five years ago she noticed a small brown spot on the right caruncle, which she tried to remove by picking it with a pin. A year ago she noticed that there were three spots, where originally there had been only one; and two or three months ago she discovered that these three spots had coalesced, making one large black dot.

Examination at this time showed a round, melanotic spot, 1.5 mm. in diameter, situated in the middle of the anterior surface of the right caruncle. Vision in each eye was 20/24; and the eye findings were entirely negative except for the melanotic dot. From the history we were satisfied that there had been a very definite increase in the size of the growth, especially during the last three months. It had none of the appearances of a pigmented mole and so it was decided to make a wide excision of the right caruncle with adjacent conjunctiva and soft parts.

Histologic examination of the car-

Fig. 1—Microphotograph of melanotic sarcoma of the caruncle. Low power.

uncle showed the growth to be a melanotic sarcoma. The pigmented cells were rather large and the growth had not extended far into the substance of the caruncle. (See microphotographs.)

201 N. Main St.

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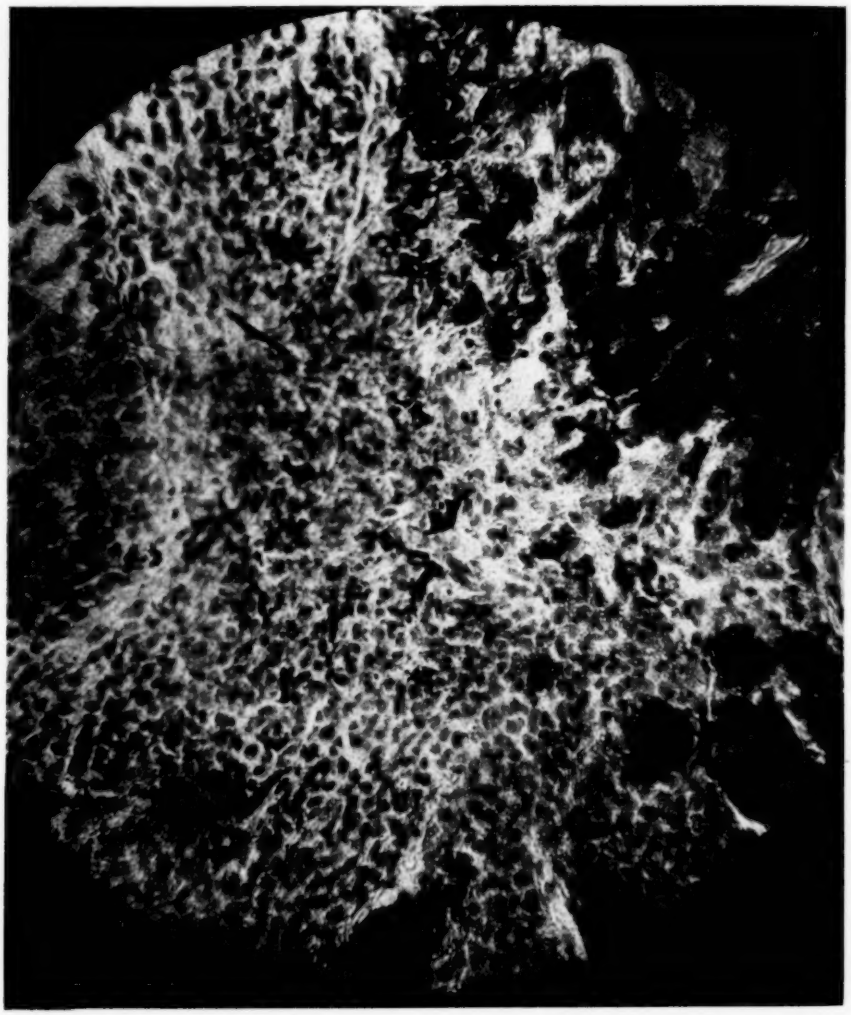

Fig. 2—Microphotograph of melanotic sarcoma of the caruncle. High power.

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A PUPILLOMETER.

C. E. Ferree and G. Rand.

BRYN MAWR, PA.

This instrument includes a telescope to magnify the pupil and a scale magnified in correct relation, on which the diameter of the pupil is read. The scale is illuminated by a minute lamp, the light from which passes between the surfaces of the glass on which the scale is ruled and is specularly reflected from the scale divisions. Quick and accurate adjustment is provided for and the instrument is widely adaptable.

There has long been a need in laboratory and clinic work for a convenient and precise means of measuring the size of the pupil and of studying its reactions. The importance of increasing our knowledge of the normal size of the pupil, its pathologic deviations, and its normal and pathologic reactions is too well recognized to require much attention here. It will be sufficient perhaps to point out that there is scarcely a function of the eye in which the pupil does not play an important part and sarcely a functional test in connection with which the pupil is not an important variable factor. The meager knowledge which we have of the pupil reactions and their effect on the various visual functions cannot, therefore, be attributed to a lack of incentive for investigation. Our own research program, for example, contains a long list of problems, work on which has been delayed or not even begun because of the lack of an instrument which has the desired precision and flexibility of use.

Some of the essentials of such an instrument may be noted in passing. (1) Because of the diminutive size of the pupil, measurement should be possible to fractions of a millimeter within a small percentage of error. (2) The method of making the measurement should not reduce the amount of light entering the eye, or in any other way disturb the reactions of the pupil to the conditions being studied. (3) It should be possible to continue the measurement without interruption thru a considerable period of time. (4) Measurement should be possible over a wide range of intensities of illumination from low to high. (5) The instrument should be easily and readily adaptable to a wide range of conditions of use.

The pupillometer to be described fulfills the above requirements to a reasonably satisfactory degree and is extremely simple in principle and construction. It consists of a telescope provided with a measuring scale extending diametrically across the field, and the auxiliary devices for adjustment needed for its precision and convenience of use. The telescope is furnished with a 12.5 cm. achromatic objective, 3.2 cm. in diameter, and a Ramsden eyepiece. The measuring scale is ruled on a disc of thin glass, 70 divisions to the centimeter. This

scale is located in the image plane of the objective lens and is therefore in the same plane as the image of the pupil to be measured. Image and scale are thus magnified the same amount by the eyepiece and the breadth of the pupil can be read directly in terms of scale divisions. The telescope is provided with a range of focus which permits of its use at distances ranging from 25 to 200 cm. The scale must of course be calibrated for the distance at which the instrument is used. This

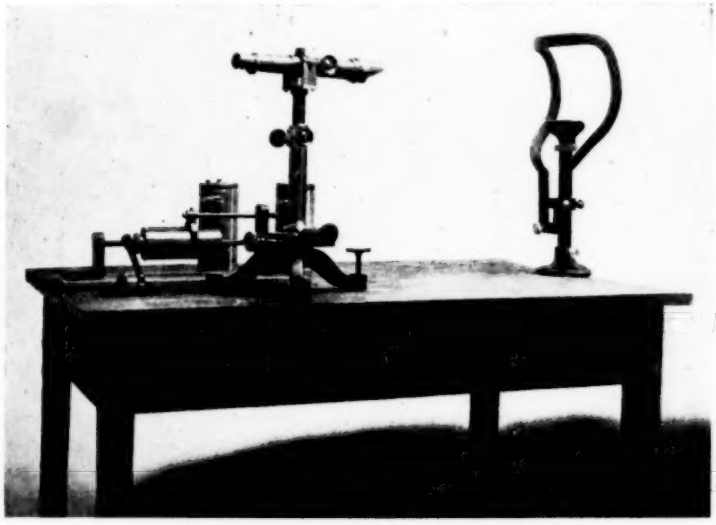

Fig. 1—Pupillometer of Ferree and Rand.

can be quickly and easily done by viewing a millimeter scale at the distance chosen and determining the relation between the two scales. In order to give a high visibility to the scale divisions as seen against the dark pupil as background, an independent source of illumination is needed for the scale. The illumination of the scale is provided for as follows: A straight edge is ground on the disc at one end of the scale. This edge is illuminated by a miniature lamp inserted in the tube shown in Fig. 1. The light passing thru the glass between its two surfaces and specularly reflected from the scale divisions, renders these divisions luminous and plainly visible without impairing the distinctness of the image of the iris and pupil. In order that the illumination provided for the scale may not be too high when the pupil is viewed under a low light and conversely, this lamp is connected in circuit with a rheostat the coil of which rotates under the contact to give small changes of resistance. The mount containing the scale is also made to rotate. This provides for the measurement of the pupil along any diameter. If viewed from a position slightly to either side of the line of sight, the vertical diameter of the pupil should be measured; if viewed from a position above or below the line of sight, the horizontal diameter is measured.

Often in the use of a telescope of this type the visibility of the object viewed can be increased considerably by shielding the objective lens from extraneous light, particularly when there is a strong component of illumination in any direction as occurs, for example, in overhead lighting. A shield for this purpose, shaped from a section of tubing and blacked on the inside, is shown in the figure. It is held in position by a ring at one end which slips over the end of the tube of the telescope. This shield can be rotated to cut off the light from any direction and can be attached and removed at will.

For the convenience of use of the instrument the following adjustments

are provided. The stem supporting the telescope is screwed to a plate which can be moved to right or left in a grooved housing by a triple-pitch screw, shown at S in Fig. 1. This housing is in turn fastened to a plate which can be moved forward or backward in a similar housing by a second screw S. The first of these adjustments provides for the placement of the scale on the image of the pupil at divisions convenient for reading, and for following slight movements of the eye to right or left; the second, for the precise regulation of the distance of the telescope, set for a fixed focus, from the eye. The telescope itself is mounted in a collar provided with two short studs or bosses extending out from either side. These bosses rest in adjustable friction bearings in the U-shaped housing shown at H in Fig. 1. This type of mounting permits of tilting the telescope up or down, as may be desired, in viewing the pupil from below or above. The telescope can be raised or lowered in the usual way by means of a rack and pinion. Finer movements are provided for by a levelling screw as shown in the figure. By means of these adjustments the instrument can be used in a variety of positions without interfering with the use of the eye or with the reactions of the pupil to the conditions under which the eye is being used.

The instrument is simple and inexpensive to construct. We have found it to be a very valuable addition to our optic and ophthalmic equipment. Of so great a value is an instrument of this type that it has been our hope that the measuring scale and the device for its illumination will be added to the telescope which at present forms one of the auxiliary attachments to the perimeter which we have described in earlier papers. The expense of making this addition would be slight and the pupillometer would constitute a valuable adjunct to a perimeter, particularly in the study of pathologic cases. Size of pupil is also one of the factors which makes perimetric determinations differ from individual to individual in case of nonpathologic eyes. That is, it is one of the factors which should be specified in forming a diagnostic scale and be allowed for in rating a case in terms of such a scale or other device used for classification. A foundation structure similar to a perimeter would be of great advantage too in furnishing the conditions and controls required for many of the purposes for which a pupillometer is needed. The details of the combined instrument,—its needs and advantages—however, will be discussed in a later paper.

ETIOLOGY AND PATHOLOGY OF PHLYCTENULAR KERATOCONJUNCTIVITIS.

A. H. ALAND, M.D.

OGDEN, UTAH.

This is a review of the literature on the subject published in the last twenty years. The widely differing views of the causation and pathology of these important conditions are here stated with fairness, in language adapted to current theories of pathology. Read before the Utah Ophthalmological Society, March, 1925.

This eye disease is also known as phlyctenulosis, conjunctivitis lymphatica, scrofulosa, phlyctenulosa, pustulosa and exanthematica. Stellwag called it herpes conjunctivae and Fuchs has named it conjunctivitis eczematosa.

The disease is characterized by the appearance of efflorescences or phlyctenules on the conjunctiva or cornea which are usually located near the limbus but may occur anywhere on either the cornea or conjunctiva. The typical phlyctenule is formed by an accumulation of leucocytes at a point near the limbus beneath the conjunctival or corneal epithelium, in the latter instance between the epithelium and Bowman's membrane. In its simplest, typical form, phlyctenular conjunctivitis presents the picture of a small red eminence of about the size of a millet seed at some point near or at the corneoscleral junction. In the beginning it is conical, but later the epithelium at the apex of the eminence sloughs forming a minute gray ulcer, which thus lies above the level of the neighboring healthy conjunctiva. By a continuation of the breaking down process the conical efflorescence at length disappears entirely, the ulcer sinks to the level of the conjunctiva, speedily becomes clean and covered with epithelium. Thus the ulcer heals without a visible mark being left upon the conjunctiva, or upon the cornea unless Bowman's membrane is involved.

As the efflorescence springs up a circumscribed zone of adjacent conjunctiva becomes hyperemic, the injected vessels being directed from all sides toward the phlyctenule. The remainder of the conjunctiva is usually free from congestion. Phlyctenular keratoconjunctivitis, hence, may be considered a focal affection of the conjunctiva or cornea, distinguished from most other varieties of conjunctivitis, which are diffuse inflammations.

According to Parsons, Iwanoff in 1869 first investigated the pathology of this disease and found infiltrating cells, chiefly polymorphonuclear leucocytes, under Bowman's membrane. Leber found giant cells in three cases out of four, not always in the nodules but under the epithelium. Wintersteiner found them only at the periphery of the ulcers. He never found caseation, altho the nodules showed some similarity to tubercles. The endothelium of the vessels was swollen, showed mitoses and sometimes giant cells.

In 1898 Baas observed that the aggregations of leucocytes always commenced below Bowman's membrane, and this observation is held by Parsons and others to indicate an endogenous rather than an exogenous origin.

The phlyctenular lesions may present wide variations from the simple type just described. The number of nodules may vary. Frequently there are several phlyctenules at the same time, or as successive outbreaks. If few in number they are usually correspondingly larger in size. In rare cases they attain almost the size of a lentil. Sometimes we find the entire limbus covered with very minute eminences, or more rarely the whole cornea becomes stippled as if fine sand had been strewn over it, disappearing after a few days without preliminary disintegration. When there are multiple efflorescences, the injected areas of conjunctiva adjacent to the separate nodules may become confluent, and cause the whole conjunctiva to appear reddened, obscuring the focal character of the disease. The palpebral conjunctiva may rarely become involved with phlyctenules, altho Elliot (Tropical Ophthalmology) mentions its frequent occurrence in hot countries.

Elschnig reports having found phlyctenules of the palpebral conjunctiva in ten per cent of the cases of severe

phlyctenule of the bulbar conjunctiva, but not in miliary phlyctenule of the limbus. Richard Gutzeit states that since the world war the number and severity of cases of keratoconjunctivitis eczematosas has markedly increased, and that whereas before the war it was confined almost exclusively to children and adolescents, he now finds it in increasing numbers in adults. He considers the chief reason for this to be the condition of malnutrition in all classes of the population. Gutzeit reports a case in an hereditary scrofulous girl who had phlyctenules of the tarsal conjunctiva, without simultaneous phlyctenules of the limbus, persisting several months; and claims it is the first reported case of phlyctenule of the tarsal conjunctiva alone. He considers the etiology of this case as tuberculous. He believes the predilection of the phlyctenules for the limbus to be due to the mechanical traction of the conjunctiva sclerae on the stationary conjunctival portion of the cornea; and the predilection for the posterior surface of the lid margin to be due to slight injuries from blepharoplegia, and disturbance of the circulation resulting from the filling and emptying of the Meibomian glands, owing to which bacterial products are more easily retained.

The site of the efflorescences may not necessarily be at or near the limbus itself, but anywhere on the anterior segment of the bulbar conjunctiva, or in the cornea itself. In the corneal lesions disintegration of the nodule may produce an ulcer penetrating deeply enough to involve the deeper corneal parenchyma, in which event a permanent opacity would remain; or perforation may ensue with resulting iris prolapse, anterior synechia, iritis, glaucoma or even panophthalmitis. The corresponding visual impairment is obvious.

The corneal ulcers may assume a serpiginous character, spreading along the surface of the cornea with a resulting vascular fasciculus, which is known as keratitis fascicularis. This picture may develop from a small ulcer at the limbus, the ulcer becoming clean at its periphery after a few days, new blood vessels pushing forward from the conjunctiva to the edge of the ulcer, while in the meantime the corneal margin of the ulcer remains infiltrated and gray, and advances as the peripheral edge heals bringing a leash of blood vessels after it. This small gray crescentic ulcer may advance far into the cornea, even beyond its center, but always remains superficial and perforation of the cornea due to it is never observed. When the ulcerative process is finally arrested the leash of vessels degenerates and becomes a cicatrix, leaving the superficial opacity of the cornea which corresponds in shape to the vascular fasciculus. The opacity never clears up completely and hence, when found at any subsequent examination, enables the oculist to diagnosticate its original cause.

The severest types of phlyctenular keratoconjunctivitis start in the deep layers of the cornea as a widely diffused deep lying infiltration. A considerable portion of the cornea exhibits a deep opacity of uniform gray or yellowish color with hazy outline over which the surface of the cornea is stippled. In the worst cases the infiltrate, which is originally gray, becomes more and more yellow and finally breaks down into pus, resulting in a rather extensive loss of substance in the cornea. In the benign cases, on the contrary, the corneal infiltration gradually disappears by resorption but the cornea rarely regains its transparency.

Instead of remaining as separate circumscribed foci the infiltration may be followed by a diffuse continuous new formation of vascularized tissue over the surface of the cornea, resulting in a form of pannus. This type of lesion is called "pannus eczematosus" to distinguish it from "trachomatous pannus." It differs from the latter in that it does not exhibit a predilection for the upper zone of the cornea but develops from any portion of the corneal margin. It is usually thin and not very vascular and may undergo complete resolution. Bruns says that types appear in the negro that he has never seen in white people, one type being that in which all the bulbar conjunctiva exposed between the lids becomes

red and thick and presents one or more ulcerative lesions. This type he calls "phlyctenule en plaque." In some cases the cornea is surrounded by a ring of infiltrated material and appears much like spring catarrh.

This disease is usually easily recognized by its being a focal affection located either upon the cornea or near its margin. It is usually accompanied by profuse lacrimation, associated with photophobia and spasm of the lids. Mucous or mucopurulent secretion is usually not present except in the rare cases when the affection spreads to the palpebral conjunctiva. Children with this disease usually bury their face in a pillow, in their mother's lap, or in their own hands, and violently resist any attempt which is made to open their eyes for examination or treatment.

The intensity of these symptoms cannot be used as a guide as to the seriousness of the disease because often in the rapidly spreading cases and those which penetrate the cornea very deeply, the symptoms are very slight. The hypersensitiveness to light (photophobia) in some cases persists for weeks or months causing the parents to assume that the child has become blind. The lids, especially the upper lid, often becomes swollen because of the interference of the circulation resulting from the lid spasm. Rarely one sees such extreme spasm of the lids that spastic entropion results. Several observers have described cases in children who had had blepharospasm for a long time, who were perfectly blind after the spasm disappeared. The blindness in these cases was transient and probably due to raised threshold for cortical stimulation.

The duration of the disease varies greatly depending upon the number and location of the lesions. When only one typical phlyctenule occurs during an attack, it may take only two or three days before it disappears, but when several phlyctenules occur in succession and develop into the more serious types, the disease may last for years. Even tho the disease continues until puberty, or adult life, we must remember that it began in childhood or youth in practically every instance.

Recurrences or acute attacks are frequent, and persons who have gone thru them often have corneal opacities which impair vision and may result in squint or myopia. Finally, a not infrequent outcome is secondary blindness, often occurring many years after the inflammation has passed and representing the after results of corneal scars with inclusion of the iris which remains after the corneal ulcers. Aside from the suffering endured and the impairment of vision; the educational loss incident to the patient's being compelled to remain out of school; the economic loss to the child, parents, and state; the anxiety of the parents as to the outcome and the interference with physical and mental development, are factors which must be considered in order to appreciate the seriousness of this disease.

Regarding the incidence of the disease, Fuchs says, it rarely occurs in children under one year of age and generally ceases about the age of puberty. N. B. Harman's figures at Belgrave Hospital showed the greatest incidence in the fifth year, and no case during the first year in four hundred cases. Statistics covering a year at Moorfields Hospital, London, showed the greatest incidence between the ages of four and fourteen. Fuchs contends that adults have carried the disease along with them from childhood. The enormous majority of children affected belong to the poorer classes. Others give a history of having become debilitated as a result of scarlet fever, measles, typhoid fever, pertussis, etc. Such children may either appear thin and anemic or bloated and spongy looking, usually exhibiting scrofulous skin lesions, patches of moist eczema upon the face, constant coryza, blepharitis, adenoids, chronic otorrhea, cervical adenitis, bone caries, or pulmonary tuberculosis, and in girls delayed or irregular menstruation. Some of the above mentioned symptoms of "scrofula," and often several of them at once, accompany most cases of this disease. Rarely the disease is observed in an individual who otherwise is quite healthy, just in the same way that other indications of scrofula occur

at times as altogether isolated phenomena.

It appears that the incidence and severity of phlyctenular keratoconjunctivitis varies in different races. Harman observed that Jews presented a very much smaller proportion of phlyctenulosis than one might expect; and asked if this observation, and the belief that the Jews were relatively immune to tuberculous infection, strengthened the tubercular theory. Bruns found that the incidence, the average age of those with the disease and the severity of the disease, differed considerably in the black and white races. In a clinic where about 40% of the patients were black, he found in his 451 cases, 13.9% were in white and 86.1% in negroes. In 3,050 cases of conjunctival disease among whites, only 14% were phlyctenular conjunctivitis, and 2,002 cases in blacks 39% were phlyctenular conjunctivitis. The liability to the disease continues thru life, to a greater age in blacks than in whites. The average age in 63 cases in whites was 8½ years, in 388 cases in negroes the average was 16 years. In another series of 243 whites the average was 10½ years, and in 366 blacks 15⅛ years.

Considerable experimental work has been done to establish the etiology of this disease. Gifford (in 1886) is given credit for being the first to investigate the bacteriology of the disease. He made smears from the surface of the conjunctiva and in some cases from the pustules surrounding the eye, but not from the phlyctenules themselves. Out of 28 cases examined he found staphylococcus pyogenes aureus and albus in 26 cases. Burchardt in 1887 found micrococcus flavus desidens and produced phlyctenule like infiltrations in rabbits' corneae with it. Leber in 1888 failed to produce phlyctenules in man by using staphylococci. In 1893 Burchardt obtained staphylococci most frequently. In 1905 Harman studied 23 cases bacteriologically, making film preparations and inoculations with the following results: In 15 cases no organisms were found in films or cultures, from either sac or phlyctenule. In four cases one or two colonies of staphylococcus albus alone appeared. In the other four cases, two had a few colonies of staphylococcus aureus in cultures from the sac, while the cultures from the phlyctenules were sterile. One case, of probable traumatic origin, gave many colonies of staphylococcus albus from the phlyctenule. In the other which was associated with acute nasal catarrh, the films showed nothing, but the cultures showed the presence of the hay bacillus. Fox (1910) said he believed the exciting cause was undoubtedly some microorganism. Weeks in "Diseases of the Eye" says that the research of others as well as of himself indicate that the affection is always due to staphylococcus. Fuchs says that if we question ourselves as to the nature of efflorescences of conjunctivitis eczematosa, we must keep two facts in mind: (1) When quite recent they are sterile, containing neither the ordinary pyogenic germs nor tubercle bacilli. Inoculation from them into a test animal does not lead to tuberculosis, hence it cannot be assumed that like other inflammations of the conjunctiva, they are referable to exogenous infection, nor can they be regarded as true tuberculous nodules. (2) In a great number of the patients with conjunctivitis eczematosa there are changes which are certainly tuberculous, and in those not showing such changes clinically, the use of tuberculin proves, with rare exception, the presence of latent tuberculosis. Phlyctenules have been known to appear on the conjunctiva of hitherto healthy children after the inoculation of tuberculin, and Verhoeff suggests that this occurrence is an example of anaphylaxis. Wolff-Eisner and Derby are of the opinion that the phlyctenules are produced by the toxins of tubercle bacilli, or by the fragments of bacilli themselves. They maintain that the question is purely one of dosage; if only a small quantity of tubercular material is deposited the pathologic changes will not be characteristic and tubercle formation will not take place. The first change in tissue produced by tubercular material may be simply the gathering of lymphoid cells. Unless a greater degree of infec-

tion takes place it seems plausible that epithelioid cells, giant cells, and caseation may all be lacking. Thus we may get tuberculosis without tubercle formation. Wolff-Eisner has shown that tuberculins always produce essentially the same effects, there being differences in degree but never in the character of the reaction, and that they act as living tubercle bacilli do, save that they are devoid of growth and reproduction. Harriman and Wolman have confirmed this contention.

I. Igersheimer, (Stuttgart) (September 1920) says: "In the normal conjunctiva the penetration of a pure culture of tubercle bacilli into the conjunctival sac produces no specific reaction. Only when the material has been injected subconjunctivally, or after injury to the mucosa, do tuberculous lesions arise. When pure cultures of human or bovine type, diluted to one mgm. to one c.c., were placed in the uninjured or in the deliberately injured conjunctival sac, this vaccination produced no reaction in the tuberculous animals, but produced a specific reaction consisting of tuberculosis of the conjunctiva or swelling of the pre auricular lymph nodes in the control animals in almost every case."

Concerning the etiology of this disease no less than eight theories have been advanced, and they will be taken up separately and briefly reviewed.

(1) Several investigators contend that the disease has a bacterial etiology because they have found present in the lesions, or in the conjunctival sac during the disease certain bacteria, usually the staphylococcus. Among those supporting this theory may be mentioned Gifford, Weeks and Fox. Parsons and others think that these bacteria are accessory and not causal and that they are more likely to be mere contaminations.

(2) Intestinal intoxication is considered the cause of the disease by Burnett, Theobald and Bruns. Swan M. Burnett believed that altho it probably did require a special germ for its causation, the condition of the general system and the state of the nutrition were important, if not the prime factors. Theobald says, "I am thoroly convinced that phlyctenular conjunctivitis is due for the most part to intestinal intoxication, due in all probability to the entrance into the circulation of bacteria or their toxins from the alimentary canal." Bruns in 1912 strongly supported this theory and expressed himself as follows: "It seems to me then, more logical in the present state of our knowledge to regard phlyctenular ophthalmia, not as the effect of a specific toxin (tuberculous) or as an ocular eczema, but rather as a neuropathic phenomenon brought about by an autointoxication originating in the great majority of cases in the derangement of the gastrointestinal functions; not all persons being equally liable to these morbid processes, but much more particularly those in whom we recognize clinically the scrofulous, lymphatic, or exudative diathesis, such persons being especially liable to tuberculous and other infectious diseases, which in their turn further depress the metabolic and catabolic processes, the functions of digestion, assimilation, secretion and excretion, and thus intensify and perpetuate the state of autointoxication." Bruns says, that hosts of observers have recognized the almost universal prevalance of gastrointestinal derangements among phlyctenular patients. The writer feels that such derangements are commonly recognized to accompany tubercle infection and that the two conditions, namely disturbed gastrointestinal functions and phlyctenulosis, might be concommitant manifestations of the activities of the tubercle bacillus. The basis for the belief in this theory rests upon the following considerations: (a) The frequency of occurrence of gastrointestinal derangements in phlyctenular patients. (b) The improvement of the eye disease after treating these derangements. (c) The frequency with which indicanuria is present in this disease.

(3) The theory of a tuberculous etiology seems to have by far the greatest number of adherents, among whom are Fuchs, Verhoeff, Derby, de Schweinitz, Walter, Wilder, Tivnen, Davis and Vaughn, Stephenson, J. H. Elliott, Goldbach and Lafon. The evi-

dence as to the tuberculous nature of this disease is based upon the following considerations: (a) The von Pirquet reaction. (b) The results of tuberculin therapy. (c) The diagnostic injection of tuberculin. (d) The presence of definite tuberculous lesions or a tubercular history in persons with phlyctenulosis. (e) The effect of general hygienic therapy upon the course of the disease. (f) The incidence of tubercle infection in children. (g) The fact that it usually occurs in those who are poorly nourished and those who live in unhygienic surroundings.

Studies of the von Pirquet reaction in this disease show that it is positive in from 67% to 92% of the cases. Derby, Stock, Weekers and Wilder have reported series of cases in which the test was positive in between 80% and 90% of the cases. Davis and Vaughn found it positive in 70%, Bruns 67.7% and Tivnen in 92%. The latter observer thinks it is a dependable means of recognition of tuberculosis in children. Harriman and Wolman state that a positive von Pirquet test cannot be used as evidence of clinical tuberculosis in adults, evidently admitting that it is quite a reliable test in children. Verhoeff explains the ten to twelve percent of negative reactions on the theory of anaphylaxis, which if correct would mean that certain cases would be in a socalled refractory stage and would fail to react to tuberculin.

In the cases recorded where tuberculin was used therapeutically, Davis and Vaughn reported 65% cured and 20% improved in a series of 40 cases; and Tivnen reported 64% cured and 26% improved in a series of 50 cases. Many other writers have reported favorable results from tuberculin therapy.

In the cases reported where tuberculin was used by injection for diagnosis there was an elevation of temperature in from 47½% to 88% of the cases.

The presence of tuberculous lesions, or a family history of tuberculosis in some form has been observed in persons with phlyctenulosis by many writers, but in the statistics upon such conditions, the percentages are much lower than those upon the von Pirquet test or the diagnostic and therapeutic injection of tuberculin. Tivnen found that 12% of his cases gave a personal history of tuberculosis. Davis and Vaughn obtained a family history in 17% of their cases, but no patient gave a personal history. De Schweinitz says, tuberculosis of lymphatic glands is present in fully half of the cases.

Most oculists seem to regulate the general hygiene of patients with phlyctenulosis and a great many feel that it is a very important factor in the amelioration of the disease. Derby thinks that general antituberculous treatment is quite efficacious and says, "Even if we are not sure that phlyctenular disease is actually due to tuberculosis, it would be better if we assumed that it was, because the problem is essentially the problem of tuberculosis."

The ubiquity of tubercular infection in all children is very suggestive that this eye disease of childhood might be due to tubercle bacilli or their toxins. Hamburger, Vienna, claims that 71% of all children between the ages of seven and ten give positive von Pirquet reactions, and 94% between the ages of eleven and fourteen years. He found in 848 autopsies on patients ranging from three months to fourteen years of age, evidence of tuberculosis in 40%. And in a series of 988 von Pirquet tests on children of approximately the same ages as above he found 41% gave positive reactions. Mueller in Munich found tuberculosis in 40% of 500 autopsies on children of all ages. A report on 2,000 autopsies in New York City on children under three years of age showed tuberculosis in 15.21%. Albrect of Vienna in 1,558 autopsies on children between the ages of one and twelve found evidence of tuberculosis in 47.21%. Comby of Paris in 435 autopsies on children over two years of age found evidence of it in 65%. The incidence of tuberculosis as indicated by the von Pirquet test increases from about 15% for one year of age to about 90% for the age of fourteen. According to autopsy findings the incidence increases from about 18% for one year of age to 70% for the age of fourteen.

(4) A one sided carbohydrate diet has been considered the cause of this condition by James W. Barrett of Melbourne, Schuetz and Videky, Goldenburg and Ramsay. The evidence to support this theory is quite meager and no convincing statistics appear to have been accumulated concerning this possible cause. Michael Goldenburg has made a rather extensive study of the carbohydrate theory covering some 500 cases in the Illinois Charitable Eye and Ear Infirmary, from which he drew some conclusions quite at variance with most observers. His conclusions were: (a) Ophthalmia eczematosa is not a true pathologic entity but a symptomatic manifestation of a systemic disturbance. (b) Tuberculosis, syphilis and sepsis can be excluded with certainty as causal factors. (c) Phlyctenular conjunctivitis is in all probability one of the expressions of vagus system irritability, produced by some toxic agent resulting from faulty carbohydrate chemism. (d) Correction of the faulty chemism, by carbohydrate free diet, and control of the vagus hypertonia, thru the topical and internal use of atropin yield the best and quickest therapeutic results.

(5) Working upon the suggestion made by M. Morard, that phlyctenular conjunctivitis was caused and kept up by a diseased state of the mucous membrane, Bruns had 172 out of his 451 cases examined by Dr. R. C. Lynch, who found rhinitis, diseased tonsils, suppurative otitis, etc., in 105 cases, or 61%, and nothing abnormal in 67, or 38% of the cases. Purposely no treatment was given the eyes in these cases except to have the nasopharyngeal conditions corrected and the ophthalmia rapidly disappeared.

(6) The relation between phlyctenular conjunctivitis and eczema has been mentioned by many writers. Bruns says he has rarely observed it. Stevenson found it in 58% in 100 consecutive cases, and in 49% in another series of 529 cases, and in 83% in a third series of 136 cases.

(7) Lafon thinks that there is a large percentage of the cases of phlyctenulosis which are due to the exanthemata.

(8) Joseph observed 30 cases of this disease which were cured by treating pediculosis capitis.

(9) Hunter H. Turner (1917) thought the disease was due to chronic low grade ethmoiditis, with obstruction to drainage.

CONCLUSIONS. The conclusions drawn from an extended survey of the literature on this disease are: (1) That phlyctenular keratoconjunctivitis is definitely a disease of childhood and adolescence, and one of the most frequent of all eye diseases in dispensary work and free clinics.

(2) That it seems to show racial differences in incidence and severity.

(3). That the pathologic and bacteriologic studies of the disease indicate that it has an endogenous origin, and that the pathology is not typical of a tuberculous lesion, but similar to it and has been designated as a pseudotubercle.

(4). That, of the many theories advanced as to the etiologic factor, the preponderance of evidence is in favor of tuberculous toxemia.

(5). That intestinal intoxication appears to be the next most likely cause.

(6). That local treatment is important but secondary to constitutional treatment.

(7). That the disease should be considered as tuberculous and treated as such until the etiology is definitely proven; and that treating as tuberculous does not necessarily mean the employment of tuberculin therapeutically in all cases, but its judicious use after proper dietary, hygienic and local treatment has proven inefficacious.

(8). That there is need for further statistic and therapeutic study of the underlying causes of this disease, before the etiology can be considered proven.

Eccles Building.

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UNILATERAL PROPTOSIS DUE TO SCURVY.

E. Clifford Place, M.D.

BROOKLYN, N. Y.

Proptosis in a boy of 8 months appeared and recurred after crying. Suspicion of ethmoiditis led to incision of the swelling, revealing a subperiosteal space containing remains of old blood clot. Correct diet brought rapid return to health. Read before the Brooklyn Ophthalmological Society, October, 1924.

On June 21, 1924 a white boy aged eight months, was referred to me with the following history: About three weeks previously, following a severe crying spell, the lid of the left eye became red and swollen, and the baby kept rubbing his eye. This grew better in the course of a week, only to come up again at the end of this week, after another fit of crying. It again improved, but on the day preceding the child had cried once more, and the eye had bulged again. The baby had had a cold, but this had seemed better for the past week.

During the subsequent examination, to facilitate which the parents restrained his arms and legs, it was noticed that this restraint seemed to produce pain; and this elicited the further information that since the eye trouble began it had hurt the baby to have his arms or legs moved, tho the parents stated that he moved them freely himself. This aroused a certain suspicion in my mind, but when the parents said that they were feeding the boy on a formula prescribed by the family physician, and that he was also getting orange juice, this suspicion was dismissed.

Examination showed a plump but pale, anemic and rather sick looking child, with two teeth. The left eye was rather markedly proptosed, being displaced forward, downward and outward, and only slightly mobile. The upper lid was somewhat swollen, purple in color, but neither brawny nor infiltrated to any marked degree. The child could not close this eye. Because of the restlessness and peevishness of the patient ophthalmoscopic examination was rather unsatisfactory, but the fundus appeared normal.

The history of head cold suggested

ethmoiditis as a possible cause of the exophthalmos, thru orbital cellulitis, and the boy was sent to a rhinologist, who concurred in this probability, and who ordered nasal treatment for this condition. The child returned at the end of a week, not better but worse. The exophthalmos was more pronounced, the lid more swollen, and operation for the relief of orbital cellulitis was determined upon and carried out the same day.

At the Brooklyn Eye and Ear Hospital an incision was made thru the inner third of the upper lid, but contrary to expectation, no pus appeared. Upon exploration with a probe the instrument sank almost without obstruction to the very apex of the orbit, sliding along the surface of the orbital plate of the ethmoid, which was denuded of its periosteum over practically its entire area. There was evidently a large cavity between the surface of this bone and its periosteum. No roughness indicative of necrosis was encountered, and no pus was found. A few flecks of old blood clot were all that was obtained from the cavity, and the later laboratory report on this material stated that it was free from organisms and pus cells, and consisted mostly of broken down blood clot.

A tube was inserted deeply into the orbit, and nothing further was done. At the daily dressings there continued to be no discharge from the wound. As tenderness of the arms and legs continued, and a closer examination showed swellings at both wrists and ankles, the suspicion which had entered my mind on the occasion of the child's first visit and had been allayed by the parents' statements as to diet, persisted and grew. So on the second day after operation Dr. John W. Parrish, the consulting pediatrician of the hospital, was requested to see the case. He examined the boy and that evening called me on the telephone and said, "Why, Doctor, that baby has scurvy" And so it proved.

Dr. Parrish found that the child was being fed on a formula, consisting of maltine malt soup, flour, water and milk, but the mother simmered the already pasteurized milk for about a half hour before mixing the feeding, and altho they had given orange juice a few times, it seemed to cause gas in the baby's stomach, so it had been discontinued. The diet was immediately changed to certified milk to be taken raw, not boiled, the juice of one orange daily, and cod liver oil.

The tube was left out on the twelfth day, and the sinus was healed on the twenty-first day after operation, and the patient discharged. The lid had softened and subsided and the globe had receded considerably, the tenderness of the limbs had disappeared, tho the epiphyses remained swollen.

I saw the child again on Sept. 23, 1924, about three months after the first visit, and from being a sick looking, peevish, rather backward baby, he had become a laughing, happy, healthy looking boy, had cut two more teeth, and was beginning to talk. The wrists and ankles were no longer swollen, but the left eye was still slightly displaced forward and downward. This is doubtless due to fibrous tissue in the orbit and will probably clear up completely in a short time.

In reviewing the literature in connection with this case it would seem that this complication of scurvy is more familiar to the pediatrician than to the ophthalmologist, and, it seems to me, naturally so. That it is not an extremely rare complication would appear from the figures in the report of the committee of the American Pediatric Society in its "Collective Investigation of Infantile Scurvy in North America" in 1898. Of 379 cases, swelling and protrusion of the eye was noted in 40 instances. Huebner found it in 4 cases out of 65, Jacobi in 4 cases out of 40. Thus exophthalmos may be said to occur in approximately 10% of the cases of infantile scurvy.

In 1912, L. R. DeBuys, a pediatrician, in reporting a case, reviewed the literature to date, and found full reports of only twelve other cases beside his own, the first being that of Magnus in 1878. Eugene M. Blake added a case in 1921, and was able to find a record of only one other reported since 1912. So, altho there may

be a good many cases of scurvy complicated by exophthalmos, they do not all find their way into the literature. The condition is barely mentioned in the text books, either those on the diseases of children or of the eye. Fuchs merely mentions it, and refers to Sydney Stephenson, who in the Ophthalmoscope of March, 1915, gives a full account of certain aspects of ocular manifestations of infantile scurvy, of which, by the way, exophthalmos is only one. He says that this commonest sign is really dual, consisting of (a) protrusion of the eye balls, and (b) hemorrhage beneath the skin of the lids or neighboring parts.

The mechanism of the production of the exophthalmos consists either in ecchymoses into the loose areolar tissue around the orbit or in hemorrhage beneath the periosteum of the bones of the orbit, as was present in the case here reported. If the hemorrhage extends in front of the septum orbitale, then the lid is also involved, with ecchymosis and swelling.

The exophthalmos occurs suddenly, commonly after a fit of crying, (which brings to my mind the question of whether the crying may not as readily be considered an effect as a cause) it may appear in one or both eyes, or in one first and the other subsequently, and may recede and recur, or may remain stationary from the onset. The symptom is usually a late one in scurvy, but Barlow has described a case in which it was the only symptom. DeBuys, in his paper, describes the differential diagnosis of scorbutic exophthalmos from the exophthalmos caused by injury, malignancy, gumma, mucocele, encephalocele and hydrocephalus. The most important point in the diagnosis is the sudden onset, and he agrees with Barlow in emphasizing the value of the therapeutic test. A corrected diet should produce improvement in four or five days if the condition is due to scurvy.

The chief importance to the ophthalmologist of the ability to recognize these cases lies in the fact that in a certain number of them the exophthalmos may be the first and in others the only sign of scurvy. It is therefore timely to repeat the warning found in the American Encyclopedia of Ophthalmology: "A black or protruding eye, occurring during the first dentition and not due to injury, is much more likely to be caused by scurvy than by anything else."

59 Livingston St.

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NOTES, CASES, INSTRUMENTS

DRY HEAT FOR IRIDO-KERATITIS.

A. P. SCHULTZ, M.D.

BROOKLYN, N. Y.

I found a method which gave me so much relief from intense pain, that I should consider myself an ingrate if I did not make it known far and wide. On March 25th I was taken with an iridokeratitis. The onset was very sudden, while diving. No underlying cause was found. All laboratory tests were negative, X-ray examinations and clinical examinations likewise. The tuberculin test was not tried. I consider it worthless; it is positive in too many people, and in my case the symptoms of a positive tuberculin reaction developed by omitting atophan for one day.

After two months treatment, the best and most conscientious possible, and many consultations, the conditions were worse than before. Atophan alone gave relief, and that only for the time being. The instillation of one-half per cent of atropin solution was intolerable, dionin impossible. After taking atophan almost continuously for five weeks I decided to discontinue it. It should not be taken continuously for longer than five or six days.

On May 23rd I took instead 80 grains of sodium salicylate. Pain, redness, photophobia increased. On May 24th I took 40 grains of sodium salicylate and 25 grains of aspirin, the pain decreased a little, all other symptoms were worse. On May 25th all symptoms were much worse. I added 16 capsules of colchi-sal to the other drugs. The hot fomentations I continued. No relief.

During the night the pain was terrible. Hot applications were unbearable. I had to go back to atophan, 15 grains gave relief for an hour. I took 15 grains more of atophan and a little later one-half grain of codein. The pain was better, but all other symptoms were as severe as before. This medication could not go on. I tried hot baths, and hot compresses, again. These were intolerable. Even steaming the eye was unbearable. Tension remained normal.

On May 26th the eye was terribly inflamed, the color of a dark cherry red. Iris and pupil indistinguishable, one equal gray. Sight almost gone. I could count fingers if I moved them in good light and if less than one foot away. To have something crawl over the eye, separating the individual from the rest of human kind, is one of the most terrible experiences a man can have.

I thought of the electric heater (with the copper reflector). The thought proved an inspiration, a Godsend. I had the diffuse hot light fall on forehead, temple and eyelid for one and one-half to two hours, and what relief! It was phenomenal, truly miraculous. The thermometer held in front of the eye registered 138°. The heat burned the skin, the eyebrows and the eyelashes, but I could feel the eye improve. In less than two hours the pain was gone. This was about 9 P. M. on May 26th. On May 27th in the morning all the symptoms were better and I decided to give the hot air application a thoro trial as a curative measure. I had that heat pour on the parts from 10 A. M. to 12 M. noon, and from 1 P. M. to 5:30 P. M.

The results were truly wonderful, the photophobia was all gone, so was the pain; and the redness was 50% less. The treatment was an ordeal, and frequently I had to increase the distance from the heater. A man who is in danger of losing an eye can stand much more than he thinks. On May 28th I repeated this hot air radiation treatment, from 4:30 to 10 A. M.; when I was completely exhausted from heat and perspiration; too weak to stand, but the eye wonderfully improved, very little redness left and sight also improved.

I cannot thank the eye surgeons enough for all that was done for me, but this one simple factor turned the scale. Since then I am using this radiant diffuse heat, at about 125 degrees, one to two hours in the morning and one to two hours at night, and the corneal infiltration is clearing up, sight

improving. This, of eourse, is not due to this treatment alone but to the excellent treatment by the eye surgeons, Dr. Steinbuegler, and Dr. Koeppe, and Dr. Evans.

SUMMARY: In my case of iridokeratitis:

1. As a pain relieving measure the intense dry radiant heat had no equal. It had no second.

2. It not only relieved pain, but cured in a few days the acute trouble which had resisted all treatments for two months. Atophan helped, but before the use of the intense heat radiation it gave relief from pain only, and that only when taken continuously in large doses, forty-five grains a day. Since May 26th, 15 to 22½ grains a day for five days and no medicine at all for 8 or 10 days was all I used.

3. By accomplishing 1 and 2 it made possible again the local treatment of the eye with dionin and thiosinamin; and

4. It helped clear up the corneal infiltration, and the sight improving rapidly.

54 Martense Street.

EPILEPSY IN ITS RELATION TO OCULAR STRAIN.

JAMES ALBERT MORGAN, M.D.

HONOLULU, T. H.

Epilepsy is a symptom complex, which occurs in persons predisposed to nervous excitability and may come from a variety of causes.

Among the organic causes are depressed fractures of the cranial bones, tumors of the brain, syphilis, meningitis, abscess of the brain, peripheral nerve disease or anatomic causes. In these instances it is purely a symptom. The same symptom complex may be precipitated by purely functional causes in persons predisposed thereto; mental and gastric disturbances, fatigue or excitement, and in these cases it is also only a symptom, indicating a tendency towards this form of nervous excitability.

The so called idiopathic epilepsy is also purely a symptom complex, existing in persons predisposed thereto and precipitated by some functional reflex disturbance, which is undiscovered and unsuspected. This symptom complex soon tends to become a fixed habit, and the more the brain has been subjected to periodic discharges of nervous force the more prone it becomes to repeated attacks.

Not only this, but the tendency is for the attacks to become more and more severe as time goes by, and persons of neurotic family history and of great nervous excitability soon form a habit, which at first might have been discontinued if the source of nervous irritation had been removed early, but in time becomes so fixed and overpowering that it may continue after the original cause is removed. The attacks may then be precipitated by many other sources of reflex nervous irritation. If this is true, it is clear that the earlier the source of reflex nervous irritation which is producing epileptic convulsion is removed, the greater is the chance of a radical cure.

Ocular strain may be the direct cause of this symptom complex, and the amount of relief from these epileptic attacks which may be derived from the doing away with this strain, when that is the precipitating cause, will, of course, vary in proportion to the length of time that the patient has been subject to such nervous crises. The most brilliant results may be obtained in cases in which the epileptic habit has not been of long duration. The following case is an example of ocular strain as the predominating factor in the causation of epileptiform convulsions.

The patient, W. H., a male, twelve years of age, Anglosaxon, of island birth. There is no evidence of neurotic heredity. The grandfather, uncle, and mother have a high grade myopia. The father also has a high grade myopic astigmatism, but no neurotic tendency, so far as could be ascertained. The patient was a full term baby, by normal labor and breast fed for nine months. He had none of the usual diseases of childhood, except a mild attack of measles at the age of four. He developed rapidly and at the age of eleven, was a healthy, well developed boy weighing 115 pounds.

While in Victoria, B. C., in June last year he had a fall striking his knees, one of which was badly cut. The head was jerked backward but not injured. A few days after this slight accident the epileptiform attacks commenced. The attacks occurred weekly at first, but by January of this year there were as many as four in twenty-four hours. No aura preceded the attacks, which were characterized by general convulsive movements and marked rigidity in the hands. The patient would become unconscious and remain in that state during the attack, awakening in a few moments subsequently. There was no incontinence of urine or biting of the tongue. One attack occurred while he was climbing a tree and at another time while in swimming, without serious results. Two years ago the patient had an abscess in the right middle ear, which ruptured spontaneously. There was a slight rise of temperature for two days.

Following the first attack in Victoria, his tonsils were removed.

After returning to Honolulu early this year, the patient had a course of chiropractic treatments, which were guaranteed as a cure for this condition.

Examination by the writer showed a negative blood Wassermann and a negative urinalysis. The teeth were in excellent condition. X-ray revealed a cloudy left maxillary sinus, which was evacuated of a small amount of mucopus. The attacks continued after the sinus was emptied.

Refraction revealed one diopter of myopic astigmatism. Subsequent to correcting the refractive error, on January 13th last, there has been but one epileptiform attack; which was precipitated by the appearance of a furuncle in the right nostril. The discontinuance of the epileptic attacks following the correction of the refractive error, and the recurrence of the attack with the furuncle, demonstrates not only the neurotic tendency of the patient, but the fact that the habit of the nervous system to convulse had not been entirely overcome.

48 Young Building.

CASE OF HERPES NEURALGICA.

DONALD J. LYLE, M.D.

CINCINNATI, OHIO.

Mr. S. R., white male, age 58, a clerk, complained of pain in his eyes. This was so severe that the patient had attempted to end his life by drinking an ounce of tincture of iodin. When I saw the man he was writhing in bed and moaning. His face was bloated, both eyes swollen shut, and there was marked supra- and infraorbital puffiness and redness. The lid margins were covered with dry crusts, the lids were opened with much effort and pain. The conjunctivae were inflamed: there was both deep and superficial injection. Twelve to fifteen small, superficial eruptive vesicles were seen on the cornea of both eyes, scattered about in no special groups or areas. There were also several small superficial denuded areas, where vesicles had apparently ruptured, that stained with fluorescein. The vesicles were so small as to be hardly visible to the naked eye.

The pain was relieved by opening the vesicles and bandaging the eyes. The edema, pain, and redness began about one day before the eruption could be seen on the cornea. The attacks recurred apparently for no reason, and at indifferent intervals. During remissions blepharospasm, epiphora, photophobia and conjunctival injection were present.

The patient stated that he had had terrific headaches in and around his eyes for the past three years. He had not been sick since he was a child. A thoro search for the cause was undertaken with negative results. A summary of the findings were as follows. Blood and spinal examinations negative: X-ray of sinuses negative: nose and throat examination negative. X-ray of the skull showed a relatively small sella turcica with closely approximated clinoid processes: the posterior processes seemed eroded, due possibly to some lesion in that region. Repeated urinalysis revealed nothing wrong in the urinary tract. Blood sugar tests showed sugar present in

0.08 per cent: urea N. 15 mgms. Uric acid 1 mgm. Analysis of gastric contents showed no gastric difficulty. Differential blood count showed nothing abnormal. Psychologist reported negative findings. Temperature, respiration, and pulse was normal at all times. Blood pressure was 135/95. All the teeth were out.

Refraction showed emmetropia: vision was 20/20, both eyes; tension (McLean) right 35, left 40. The field was slightly constricted above, probably due to the ptosis, and laterally to some extent. Muscle balance normal. Media were clear; fundi were negative. From the examination of the eye it is evident that the only ocular lesion is in the cornea, unless the corneal trouble cannot account for the marked blepharospasm and constant conjunctival irritation.

This case resembles Cabannes' type of herpes neuralgica, which Graefe observed only four times in five thousand cases. This variety is preceded by violent pain, for twenty-four hours before eruption appears. The pain ceases with the advent of the vesicles which rupture and heal in from two to four days. The symptoms are intense neuralgia in the ophthalmic region, blepharospasm, photophobia, lacrimation and conjunctival injection, edema and redness of the lids, all of which were found in this case. During the interval, these symptoms are less marked.

This case somewhat resembles herpes febrilis, but we have no febrile cause for the attacks. The vesicles in herpes neuralgica are more superficial and quicker to heal, than those in other forms of herpes.

19 W. 7th St.

A CASE OF KERATITIS DISCIFORMIS.

CLARENCE E. IDE, M.D., F.A.C.S.

LONG BEACH, CALIF.

If I could have painted a picture of the eye in this case, it would have borne an exact resemblance to the colored cut of Bane's case appearing as the frontispiece of the Nov. 1921 issue of the AMERICAN JOURNAL OF OPHTHALMOLOGY.

Nov. 27, 1922, G. G., Mexican, age 55, presented herself for relief of failure of vision of right eye, due to a central opacity of the cornea. This opacity consisted of a uniformly gray disc shaped, exactly circular area, involving 2/3 of the middle layer of the cornea, its periphery being sharply defined, surrounded by a perfectly clear border. The surface of the cornea was smooth and lustrous. With the loupe it was seen that the opacity was composed of minute clumps and dots.

History: 15 months ago a foreign body entered R. E. During the next week it became inflamed and red. The patient had a fall two months ago, suffering a blow on the head, which she thought was the cause of the opacity. Lens of L. E. showed incipient opacity, altho vision was 6/6. Blood Wassermann reported negative. Von Pirquet to R. forearm negative, after 24, 48 and 72 hours.

Treatment from Nov. 27 to Aug. 20, consisted of 100% dionin 65 times, followed by George therapeutic lamp, 20 to 30 minutes. Beginning with Nov. 28, subconjunctival injections of sodium chlorid 6⅔% with novocain once, the same with dionin in addition 8 times, sodium saccharinate with dionin and novocain once; sodium iodate with dionin and novocain 3 times; sodium cinnamate (hetol) with dionin and novocain 4 times, Ung. Hyd. Ox. Flav. 27 times, Eserin 13 times (tension McLean up to 35-45) Ung. Thiosindmin 16 times, Atropin sulphate 19 times. For home use, Ung. Hyd. Ox. Flav. 1 and 2%, Dionin drops, Sod. iodid internally, Ung. Thiosindman 5%. By Nov. 29th, the opacity was less dense and by Dec. 1, the cornea was clearing thruout. By Dec. 11, it was possible with the loupe to see that the pupillary border had posterior synechiae, was somewhat irregular and its area filled with organized exudate.

A parenteral injection of milk was given Nov. 18, 3 c.c. Jan. 17, the tension with McLean tonometer was 35; Jan. 22, 45.

The cornea cleared considerably, to the extent that there was good light

perception and projection, also perception of form, as of my body; but beyond this there was no further improvement. Lenticular opacity may have been present.

The idea that this condition is a tuberculous manifestation is interesting altho the tuberculin test, after the von Pirquet method, was absolutely negative. Had it been positive in this adult, I should have investigated further with the intradermic injection method.

917 Security Bldg.

TREATMENT OF SERPIGINOUS ULCER OF THE CORNEA.

DIKRAN M. YAZUJIAN, M.D.

TRENTON, N. J.

In spite of the newer antiseptic collyria and the thermophores employed in recent years the treatment of serpiginous ulcer of the cornea still remains unsatisfactory. The reason is that by the time the measures employed have checked the spread of the ulcer it very often has involved the center of the cornea, producing industrial blindness. In other words, we fail to check promptly enough the progress of the ulcer. The same is true about cauterizing the ulcer with strong chemicals or with electric cautery, in which case we destroy the bacteria at the site of the ulcer, but fail to kill the ones in the conjunctival cul-de-sac, with the result that reinfection of the ulcer bed takes place.

The author, making use of the well known fact that decrease of the intraocular tension brings about regression of corneal ulcers, has employed a method which for the last seven years has promptly stopped the progress of such ulcers without producing complications. His method is as follows: On seeing an ulcer which looks suspicious of being serpiginous in type he employs heat, atropin and numoquin hydrochlorid or mercurochrome. If at the end of 12-18 hours the ulcer has at all spread, especially towards the center of the cornea, without further waiting he anesthetizes the eye and with the cautery point he has devised for the purpose (seen in the cut) he punctures the cornea in the ulcer area as far from the iris as possible. The needle should be heated to bright red heat in order to quickly puncture the cornea without cooking it, and withdrawn as soon as Descemet's membrane is pierced and aqueous spirts out. The aqueous cools off the point of the needle, and with ordinary care and promptness no injury is done to the iris or to the lens. The rest of the ulcer bed need not be cauterized. The eye is bandaged with gauze and adhesive. The next day the ulcer is invariably found to have changed into a regressive one, and the usual treatment with atropin and yellow oxid ointment is all that is necessary to cure it.

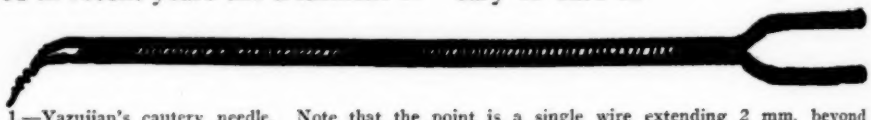

Fig. 1.—Yazujian's cautery needle. Note that the point is a single wire extending 2 mm. beyond the twisted double end.

The advantages of this method are:

1. The minuteness of the puncture in the cornea.
2. The needle being hot kills the bacteria in its path, and enters the anterior chamber in sterile condition.
3. The escaping aqueous keeps washing out the puncture tract, thus preventing bacteria from entering into the eyeball while the perforation is closing (which takes 12 to 24 hours).
4. Hernia of the iris, luxation of the lens, or intraocular hemorrhage has not been encountered by the author, perhaps due to minute size of the perforation not allowing the aqueous to pour out as it does in the case of deep ulcers going to spontaneous perforation, or as during a Saemisch incision.
5. The scar from the puncture being in the ulcer area does not add to the size of the scar left by the ulcer.
6. The operation can be done in the office, and the patient does not have to be confined to bed.
7. It is the only method known to the author upon which he can put absolute reliance.

562 E. State St.

SOCIETY PROCEEDINGS

BROOKLYN OPHTHALMOLOGICAL SOCIETY.

October 15, 1925.

DR. RALPH I. LLOYD, Presiding.

Traumatic Pulsating Exophthalmos.

DR. I. D. KRUSKAL presented this case previously published, A. J. O., v. 8, p. 141.

Bilateral Exophthalmos Due to Chloroma.

DR. JAMES H. ANDREW presented the case history of a colored child, three years old, who entered the hospital for observation following a head injury of no importance. The following day, the child developed an exophthalmos of one eye. On physical examination, there was found enlargement of the cervical, axillary, and inguinal glands; also a large liver and spleen. A blood count revealed a leucocytosis of 80,000. A few days later, the other eye became proptosed.

Ophthalmoscopic examination showed, in both eyes, peculiar retinal hemorrhages surrounded by greyish-white zones. The left eye showed a neoplasm about two disc diameters in size, situated below and to the nasal side of the disc.

The child died and the autopsy revealed multiple chloromata. It was impossible to obtain a section of the eye because the child had been made a coroner's case on account of the supposed injury.

Unilateral Proptosis Due to Scurvy.

DR. E. CLIFFORD PLACE presented his case of unilateral proptosis in a child suffering from scurvy. See p. 955.

Subluxation of Globe, Probably Congenital.

DR. SAMUEL W. GREEN: Mr. W. B., age 47, complaining of "bulging of both eyes." The patient has noticed for the past fourteen years that, on arising, his ocular globes were dislocated forward. His vision was 20/20 in each eye; under homatropin, the same. Retinoscopy determined emmetropia in both eyes. A low degree of presbyopia existed that was suitably corrected by glasses. The pupils reacted to light, directly and consensually, and to accommodation. Corneal sensitivity, media, and uveal tract were normal. The fundi showed the discs normal; vessels normal, peripheral retina, normal. The tension was normal to digital palpation. Peripheral fields were normal for form and color defects in the central fields, or abnormal scotomata did not exist. Examination of the extraocular muscles determined no interference with any of their excursions. Transillumination of both frontal sinuses showed them clear but the infraorbital borders of the malar eminence showed an unusual concavity. He regretted that the blood Wassermann and roentgenographic examination had not yet been made.

He then proceeded to subluxate the patient's globes digitally. He succeeded with startling ease. Within a few moments, he reduced the subluxation.

Mechanism of Heredity.

PROF. MARY B. STARK told how Gregor Johan Mendel, playing solitaire with green peas, came to conclusions which he read in a paper in 1865 before a scientific society in Brunn.

Yellow peas crossed with green gave a generation of all yellow. The green color was eclipsed (being recessive) by the insistent yellow (the dominant). From each, there came, when inbred, three yellow to one green. Of these, the green always gave green just as one of the yellow always bred yellow. The remaining two gave three yellow and one green each; repeating the history of the first generation. The unit character for yellow and for green did not blend in the mother cell but remained separate.

The paper caused no commotion and was forgotten until thirty-five years later, when three men in different countries published the same facts in 1900: De Vries, in Holland; Correns, in Germany, and Tschermak, in Austria. But now the significance of the work was evident because the importance of the chromosomes was understood. Every species has a constant

number of chromosomes in the egg and in the sperm cells; the human has forty-eight. Painter, of Texas, worked out the fact that they occurred always in pairs. And the mechanism of heredity is to be found in the behavior of the chromosomes.

In cell division, the chromosomes first split axially and then migrate, in two groups, to the opposite poles of the cell. When the cell divides, the two daughter cells have, each, the original number of paired chromosomes. The germ cells, in maturation, have their chromosome (factors) pairs separate, without splitting, and migrate to opposite poles (segregation) of the dividing cell. These daughter cells, in the case of both sperm and ovum, contain now some one factor of each pair. When fertilization takes place, the sperm adds its number to that of the egg so that it then has the number of paired factors constant for the species —one-half from the male and the other half from the female. Each pair conjugates and the elements of the factors mix. When growth takes place by cell division, the chromosomes split axially and continue to do so for the life of the individual.

Bateson and Punnett discovered in the sweet pea the principle of linkage—two factors which tend to be transmitted together. Morgan, working with the fruit fly, Drosophila ampelophila, found over four hundred mutations which tended to be inherited in groups of four which corresponded to the number and size of the paired chromosomes constant for the species. One of these was coupled up with sex —sex linked.

An example of transmission of sex linked characteristics will explain color blindness in the human. The dominant color of the eye of the fly is red. If a white-eyed male is crossed with a red-eyed female, the offspring all have red eyes. The second generation, inbred, gives rise to three red-eyed to one white. And these white-eyed flies are males. If we substitute color blind factors in place of white-eyed factors, then color blindness can be transmitted only by a daughter to her son. When Morgan crossed a white-eyed female with a red-eyed male, there resulted two white-eyed flies, male and female, and two red-eyed flies, male and female. He called this result reciprocal crossings.

In man, it is difficult to study heredity because of the relatively minute number of children and because miscarriages interrupt the series. There are some diseases of the eye which seem to be hereditary. *Color blindness* is sex linked. The male sex chromosome carries the recessive characteristic. The first generation shows no disturbance, but a daughter of this generation may pass it on to one-half of her sons. A female color blind person is possible by a reciprocal cross, but this must be very rare. *Hereditary optic atrophy* seems to be sex linked on the female side tho not enough data are available. Some ocular palsies fall into this group. The muscular atrophies are sex linked on the female side. The son receives a factor from his mother, but the disease seems to necessitate two factors. It is difficult to say which governs the disease, dominant or recessive.

Pigmentary degeneration of the retina. Nettleship reported a series of cases in which one-fourth had a hereditary history and another fourth a history of consanguinity. The records are imperfect. The factors seem to be dominant and handed down directly to the next generation.

Amaurotic family idiocy occurs in the Jewish race; the factors, probably, recessive. Hereditary degeneration of the cornea, Doyne's familial choroiditis, symmetric familial degeneration of the macula are little understood in relation to the mechanism of the inheritance. Löffler showed a continuous direct descent in chronic simple glaucoma.

Discussion. Dr. Ralph I. Lloyd: I have seen eight families in which there is a tendency towards chronic simple glaucoma, three generations of colobomata, and one woman who was color blind.

Subjective Skiascopy

Charles Sheard, Ph.D. of the Mayo Foundation, spoke on subjective skiascopy using lantern slides to illustrate

his talk. A small source of homogeneous light, against a black background, is placed twenty feet from the observer seated in a darkened room. Looking at the light, the observer moves a narrow screen like a straw or pencil, back and forth in front of his eye. On the retina, a shadow is cast which is seen to move with the screen in myopia and against the screen in hyperopia. By placing lenses in front of the eye, the shadow can be neutralized within 0.12 D. without a cycloplegic.

He used different distances for the source of light, color filters of various types, diaphragms of several diameters and different rates of motion. He came to some conclusions which were borne out by the graphs he presented.

The amount of refractive error changes with the distance. For the same distance, the central portion of the lens is stronger by 0.50 to 0.75 D. The chromatic aberration is less for the central portions than the peripheral. Hence the contracted pupil aids in near vision independent of accommodation. Light, of itself, is no stimulus to accommodation when of short wave length. The best luminous object to use is light filtered in the yellow-green region. With blue light, there is a tendency towards overcorrection; with red light, towards undercorrection.

HENRY MINSKY, M.D.,
Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

April 20, 1925.

CHARLES P. SMALL, M.D., President.

Hodgkin's Disease with Orbital Complications.

DR. C. V. LUNDVICK presented from the service of Dr. G. F. Suker, Mr. W. K., who entered the Cook County Hospital March 16, 1925, with the following history: In the summer of 1918, a small nodule appeared at the left angle of the jaw. This became progressively larger, and more nodules began to appear on the left side of the neck, extending down to the supraclavicular region. Enlargements soon began to appear on the right side of the neck, extending from the angle of the jaw to the clavicle.

In September, 1919, the chain of glands on the left side of the neck was removed at the Presbyterian Hospital, and a diagnosis of tuberculosis was made. Following the operation, the glands in the neck multiplied and gradually enlarged. They were confined to the cervical regions until November, 1924, when they appeared in the left axilla, and in January, 1925, nodules appeared in the left groin. About the same time his face and eyes became swollen and red, the latter discharging a purulent material for a few days. The right eye remained swollen, and a week later it began to protrude. This protrusion gradually progressed, with loss of vision and immobility of the eyeball.

Personal and family history were essentially negative. Physical examination at time of entrance to Cook County Hospital showed a fairly well nourished and developed white adult male about forty years of age, presenting gross pathology as follows: large, firm, freely movable gland in the right and left cervical and supraclavicular regions, very marked on the right. Glands ranging in size from a pea to a plum were present in the left axilla and groin. A few small glands were found in the right axilla. The spleen was enlarged and hard, and descended two fingers below the costal margin on deep inspiration.

The right eye was proptosed about two centimeters, with a very firm indurated swelling to the outer side of the orbit and extending into it. There was a chemosis of the conjunctiva and a marked edema of the eyelids. Cornea, iris and lens were normal. Vision in this eye was limited to faint light perception and projection. The fundus showed a moderate edema of the disc, due to venous stasis, and a few scattered irregular white patches about the disc. Atrophy was well advanced. The left eye was entirely negative.

Blood findings: red count, 4,540,000; white count, 8,600; differential showed 68% polymorphonuclear neu-

trophiles, 26% lymphocytes, 4% mononuclears, and 2% eosinophiles. X-ray was negative for any bony involvement of the right orbit. Blood and spinal fluid Wassermann negative.

March 19, 1925, a gland was removed from the left axilla and the microscopic pathologic diagnosis of Hodgkin's disease was then very evident. The condition had grown slowly but progressively worse. The right eye had become more proptosed with very marked chemosis of the lower bulbar conjunctiva. The disc was very indistinct, with some cloudiness of the vitreous. Vision was barely light perception, using a strong light close to the eye.

The case was considered to be one of Hodgkin's disease with a Hodgkin's infiltration of the entire lacrimal gland, causing marked proptosis and loss of vision due to pressure optic atrophy.

Discussion. Dr. George F. Suker, in commenting on this case, said that there were several interesting and unusual features. It was quite rare for Hodgkin's disease to affect the orbit, and in this instance it also produced a choked disc and secondary optic neuritis. In this case the blood pressure was almost normal. Hodgkin's disease was well known, of course, but the rarity was the involvement mentioned. There was a difference between chloroma and Hodgkin's disease, the former being of a sarcomatous character, while Hodgkin's disease was more a tuberculous condition. Chloroma was symmetric and bilateral, and Hodgkin's disease was unilateral and asymmetric. Hodgkin's disease was limited principally to the glands, and the tenure of life expectancy was relatively short, and in chloroma was very short. In Hodgkin's disease, when the spleen became involved the expectancy was decidedly shortened. In this patient the spleen showed some involvement at this time.

Pseudoparkinson's Syndrome.

Dr. A. E. Jackson presented from the service of Dr. Suker Mr. J. S., age 41, who entered the nervous ward of Cook County Hospital, February 18, 1925, with a diagnosis of Pseudoparkinson's Syndrome, complaining of diplopia and nervousness, which had been present for eighteen months. He attributed the beginning of his trouble to an attack which he had had three years previously accompanied by headache, pains thruout the body, and fever. At that time he was confined to his bed for three months, and a diagnosis of neuritis was made. During and immediately following this illness, he remembered that he was always tired and sleepy, frequently sleeping eighteen hours out of twenty-four. Diplopia was noted for the first time about six months after confinement to bed, and was present only occasionally and not influenced by looking in any particular direction. This gradually increased, until at present he could read only by closing the right eye. Failing vision was also noted about the time of the diplopia, which also gradually increased.

Past history was essentially negative. Ordinary disease of childhood. Gonorrhea twenty years ago. Denies chancre. Wife living and well, no miscarriages. Physical examination showed pupils slightly irregular and unequal, the right being slightly larger, with very sluggish reaction. No pupillary reaction to accommodation, and the patient was unable to converge eyes. Ocular muscle movements normal in all other primary directions. Crossed diplopia present at near point and at distance; upon looking to extreme right or left, the images tended to fuse.

Vision:

R. E. = 20/100, not improved with lenses.

L. E. = 20/35, improved to 20/25 with — 1.50.

Visual fields: Blind spots about half the normal size in each eye. General peripheral contractions in each eye for color and form with an interlacing of color fields. In the left eye, the blue field was definitely larger than white. Phorometer test showed a parallactic displacement of 18 prism diopters, base in. There was an exophoria of 18 prism diopters, base in.

Fundi: Discs were pale, with margins indistinct and a preretinal haze,

especially marked in left eye. Vessels and retina just outside the discs were fogged, becoming more distinct toward the periphery of the fundus.

General examination showed a marked mask appearance of face. A tremor was present in each hand, the hands were held in the characteristic pill rolling position. All deep reflexes were exaggerated and rigidity was present in upper and lower extremities. Wassermann on blood and spinal fluid were negative, Pandy positive, and Ross Jones negative, and a cell count of 11 lymphocytes.

Diagnosis: Paralysis of convergence resulting from a supranuclear lesion due to lethargic encephalitis. Paralysis of accommodation resulting from a parasyphilitic cerebrospinal infection, as shown by pupillary changes and optic neuritis.

One month after first observation vision was as follows: R. = 20/40, with — 1.75 = 20/25. L. = 20/25, with — 1.50 = 20/15.

By adding a 20 diopter prism, base in, to right eye, patient had 20/15 vision and no diplopia for the near point. The fundi showed the disc margins distinct; the preretinal haze was much less than previously and pigmentary changes were evident in the periphery of each fundus, thus corroberating the previous diagnosis of a coexistent postencephalitic and syphilitic involvement of the eyes.

Discussion. Dr. Geo. F. Suker said that this was an exceedingly unusual case of eye muscle paralysis in a patient who was basically luetic, having had encephalitis lethargica, and eventuating in a pseudoparkinson's disease. Tho there was complete paralysis of convergence, with no pupillary contraction, yet the eyes had no limitation in turning to the extreme right or left. His monocular accommodation was accompanied by a moderate pupillary contraction. This case clearly demonstrated that the pupillary contraction during convergence was dependent upon the stimulus causing convergence, while the pupillary contraction in accommodation is independent of the simulus causing accommodation. Tho the latter may be paralyzed yet the pupil contracts, tho limited in extent, when an effort for accommodation is made. The fundi show the characteristic pigmentary changes in the retina and superficial layers of the choroid indicative of syphilis. He concurred in Dr. Jackson's analysis of the eye findings.

Calcified Lens and Ossified Choroid.

Dr. George S. Livingston presented from the Cook County Hospital, service of Dr. Suker, a Negro, Mr. J. J., who gave a history of injury to the left eye by a piece of steel, thirty years ago. This was followed by a period of several months in which the eye was inflamed and painful, and vision became progressively worse, to complete blindness. During the past month the eye had given pain. Upon admission to the hospital, the patient was found to have an atrophied left eye. X-ray examination for foreign body was negative. The lateral view, however, showed the shadow of the lens. Enucleation of the eyeball was performed. Upon sectioning the globe, the lens was found to be completely calcified, of normal size and shape. At the site of the optic disc and several millimeters around it, the choroid was found ossified, with an opening for the passage of the nerve. Further examination of the X-ray plate failed to show any shadow of the bony choroid.

Discussion. Dr. George F. Suker said that the unusual features in this case was that the X-ray depicted a calcareous lens and failed to show a bony choroid, tho both were present in the same eye. Another feature was the complete absence of any socalled sympathetic irritation, which so frequently occurred when the choroid was extensively calcareous or ossified, as in this instance.

Herpes Zoster Ophthalmicus.

Dr. E. S. McRoberts presented Mr. J., age 65, a steamfitter, whose history states that he had a severe headache and pain over the right frontal area about one week previously. The pain persisted for three days, when the patient noticed the appearance of an eruption on the right forehead, with some tearing of the right eye. Upon exami-

nation one week after the onset, about thirty vesicles were found over the right eyelid, nose, forehead and scalp. This is the region innervated by the supraorbital branch of the right trigeminal nerve. The entire area was very painful.

Vision of right eye was 20/50; left eye 20/20. About twenty small blebs, varying in size from a pinpoint to two millimeters in diameter, were present over the right cornea. There was some deep infiltration in the lower part of the cornea. Of the skin vesicles, some extended down over the right side of the nose, which is supplied by the nasociliary branch of the supraorbital nerve. This was in accord with Hutchinson's theory, that the eye is implicated only in those cases of herpes zoster ophthalmicus in which the nasociliary branch is involved.

The right eye was treated daily with 1% atropin, and 15% silvol. The pain was relieved with coal tar preparations. The herpes zoster subsided in about three weeks, and the keratitis cleared up in about five weeks. Two months after onset, the vision of the right eye was 20/30.

Orbital Tumor Treated by Electric Coagulation.

Dr. T. C. Galloway, Evanston, Ill. presented a seven year old boy, who had been first seen with Dr. C. J. Swan, May 12, 1924. For a month and a half he had pain around the left eye, and for ten days the mother had noticed that this eye was slightly more prominent and the palpebral fissure was slightly larger. Vision was 1. Proptosis was slight, the palpebral fissure was moderately widened and the bulb could not be pressed back. The pupil reacted normally. Retinal veins were moderately dilated; movement of the eye was limited in all directions. X-ray indicated no bony involvement. Under observation for one week, the proptosis definitely increased to about 8-10 mm., the palpebral fissure widened, and definite swelling of the disc developed. Temperature was normal and blood Wassermann negative.

A tentative diagnosis of malignant retrobulbar tumor was made. Exploratory Krönlein operation was urged at this time by Dr. Swan. Drs. Oscar Dodd and E. V. L. Brown agreed with the findings, the probable diagnosis, and the advice for operation. So far no section had been made of the tissue, but the tentative diagnosis of sarcoma seemed justified by the rapid growth of a retrobulbar tumor, later invading the lid tissues, in a patient of this age, with no involvement of bony structure. Operation was refused, and the patient was taken to see a number of other men in Milwaukee and Chicago. When next seen about a month later, the proptosis was much increased. Patient then began radium treatment in Chicago.

Five months later, Dr. Galloway was called by a visiting nurse to see the patient at home, and found him whimpering with pain, his head buried in the bed clothes. For three days the mother had been unable to cleanse the eye on account of the extreme tenderness. She stated that radium treatments had continued up until two months preceding, when a hopeless prognosis had been given, along with a caution against surgical intervention.

From the left orbit there protruded about 3 cm. a tumor mass, which was beefy, ulcerated, with dirty grayish exudate on its surface, the widely spread lid margins being just distinguishable. There was no discernible markings on the globe. The lids were adherent to the mass.

Two days later, Dr. B. C. Corbus coagulated this mass by surgical diathermy, using a large button electrode over the whole anterior surface, including the lid margins. After coagulation, the shrunken globe was easily shelled out of the grayish, uniform, firm tumor substance, which pressed forward from the medial superior aspects of the orbit. No attempt was made to remove the necrotic mass, which sloughed out over a period of five weeks, healthy granulations springing up at the line of separation, and epithelium growing in rapidly from the margins. On January 30, 1925, a second electrocoagulation was done by Dr. Corbus with a smaller electrode, with a design to cooking all the tissue up to the medial wall of the orbit.

There was immediate relief from pain after the first treatment, with no return since. An irregular fever of about one degree occurred during the

period of sloughing, but the patient's general condition rapidly improved, and from a morose, gloomy boy he became an alert and happy one. It was too early to predict the ultimate outcome, but the results to date had been most fortunate for the patient, and all clear gain for the method, as not possible by any other means.

Diathermy had been widely used, especially by the urologists, and Dr. Corbus and others considered it the method of choice for all malignancies in their field as well as for many benign neoplasms. The disadvantage in eye work might be that the effects might involve neighboring vital structures, but in a desperate case it seemed to be a most valuable agent.

[This patient remained well up until June, 1925, when granulations examined after removal with a radio knife proved to be sarcomatous. A third more extensive diathermy was done. The patient became blind in the other eye without definite ophthalmoscopic changes, presumably from extension along the optic tract.]

Discussion. Dr. E. V. L. Brown corroborated the apparent hopelessness of the case at the time he had seen it. Surgical measures were considered only with a view of doing all that could be done, and the nonsurgical procedure had given an apparently brilliant result.

Dr. Michael Goldenburg spoke of the case he had presented before the Society about six months previously, somewhat similar to Dr. Galloway's case. In his case he had removed the eyeball and a considerable portion of the optic nerve, which was infiltrated. About twelve days later, 50 mg. of radium was used for sixteen hours, then after three weeks the same amount of radium was used for twelve hours. The patient, a boy, was sent home apparently in excellent condition. , However, very shortly afterward, the family physician reported that the orbit was filled with a new growth which was progressing. Later he reported that the child had passed away, with symptoms of intracranial involvement. A postmortem was refused. Eye sections disclosed a sarcoma, beginning within the eyeball and proliferating into the extraocular part of the optic nerve.

From his experience at the Infirmary, he was inclined to believe, that the very young were less amenable to radium or X-ray than the adult, in this class of cases. It would be of much interest to follow these cases for a time and note what real value was disclosed by this form of therapy.

Osteoma of the Orbit

Dr. James E. Lebensohn read a paper on this subject, with stereoscopic illustrations.

Discussion. Dr. George F. Suker in commenting on this case said that osteomata appearing in this location were very frequently of ivory consistency, and possessed a potential local malignancy. Very frequently they had a narrow base of attachment—almost a pedicle. In order to avoid recurrence it was essential that the portion of bone to which this pedicle or narrow base was attached be liberally removed, as otherwise a recurrence was likely.

Detachment of the Retina. Report of Five and Seven Years "Cure" in High Myopia and in Nephritis of Pregnancy.

Dr. Louis G. Hoffman read this paper.

Discussion. Dr. E. V. L. Brown said that in the last three years he had seen three cases of arteriosclerosis in which the retina became detached. On dropping of the blood pressure from 200 to 160, one detachment disappeared, altho four or five months later it recurred. Two of these cases were of high myopia. In the third case, there was practically complete detachment, of unknown origin. When this eye was tired, at the end of the day, the patient said vision was much lower. He could detect no detachment, but there was a little different color in about one-eighth of the fundus thruout the area that had been detached before.

Dr. Harry Gradle wished to add one case to those reported, which had occurred in a 48 year old nurse, one week subsequent to a deep injection of 1/1000 cyanid of mercury for beginning lens opacities. The detachment was in the upper quadrant immediately under the site of the injection, and hung over

the upper edge of the papillomacular bundle in the form of a hammock. She was put to bed immediately, sweated, purged, and given the usual local treatment. Reattachment was complete in about three weeks, and she resumed her duties. Three months later the retina floated off again at the same spot, but to a less extent. The identical treatment was resumed and the retina reattached. In the past two years there had been no recurrence of the trouble. The vision was as good as could be expected, interfered with as it was by the lens opacities and slight myopic changes in the fundus. There was a definite small sickle shaped scotoma corresponding to the detachment.

Dr. George F. Suker stated that some years ago he had carried on a series of experiments of this nature in a number of cases. The aqueous humor was aspirated with a Luer syringe and found to be albuminous in each instance. The aqueous was withdrawn to such an extent that the iris was flat against the posterior surface of the cornea. Upon the restoration of the aqueous, the detachment subsided to a large extent in many of the cases. Complete reattachment was obtained in one case only, an Italian who had a bilateral detachment in which an aspiration with pressure was done, and normal visual fields were obtained in each eye with large restoration of useful vision. However, after several weeks there was a recurrence, and the procedure was repeated without success. Dr. Suker had never seen a case that remained reattached, no matter what was done. The vision was never restored to normal, the fields of vision were never entirely normal, and the disc invariably developed a neuritis with atrophy.

Parenteral Milk Injections in Lesions of the Posterior Section of the Eye.

Dr. Ione F. Beem read a preliminary report.

Discussion. Dr. Thomas D. Allen said: At the Presbyterian Hospital typhoid vaccine had been used in a series of cases. Milk had not been used, tho it was his understanding that a number of men in the city had tried it. According to a paper recently presented in San Francisco, milk that did not have many bacteria was not found as efficacious as that which contained a good many bacteria. Pasteurized milk was not as good as unpasteurized. A number of tests were made, and it was considered that the results obtained were due to a certain extent to the bacteria in the milk. Nearly all the milk in this city being pasteurized, typhoid vaccine was considered preferable. Milk varied in consistency, in chemical constituents and in vitamines, and when typhoid vaccine was used, they were assured of a substance of nearly constant chemical structure. This, he believed, was the theory of Key of New York, who had done considerable work on antitoxin injections particularly in corneal ulcers. At Presbyterian Hospital the final results obtained where typhoid vaccine was injected were impressive. The immediate results were frequently gratifying, occasionally exceedingly gratifying; sometimes cures followed one injection only, tho at other times relapses occurred. A uveitis treated two years ago with typhoid vaccine recovered, and last winter there was a recurrence; upon further injection, there was benefit. In his opinion the reason that milk and foreign proteins generally had fallen into disrepute was because too much reliance was placed upon them, to the extent that the source of the disease was not sought for. Much more investigation and research should be carried on in clinics and laboratories. The subject had been studied extensively in Europe since 1904, and the theory must be valuable, as there had been so many favorable reports.

Dr. Ione Beem (closing) stated that it was not the intention to go into detail as to the composition of milk in this preliminary report. As a rule the report of the laboratory had been accepted. The milk used in these cases had a fair amount of consistency as to low bacteria content. The milk had been taken to a laboratory which sent out a sterile container for the milk, and the milk furnished had been of as nearly uniform consistency as was possible. Her belief was that with the increased white cells obtained, the body was probably given a means of tiding over a period of low vitality or resistance. In several cases of lues the milk had been given, not with the idea of getting

at the etiology, but merely to help tide over, depending on the specific treatment for curative value. In one luetic case, with corneal ulcer, the treatment had been repeated many times. The milk therapy seemed to give analgesic results, and the recurrence ended finally after the patient had received sufficient specific treatment.

CLARENCE LOEB, M. D.
Recording Secretary.

COLLEGE OF PHYSICIANS OF PHILADELPHIA

Section on Ophthalmology.

MARCH 19, 1925.

Veins Extending Into the Vitreous.

DR. MARY BUCHANAN (by invitation) exhibited a case of congenital loop of veins extending into the vitreous, in a colored girl, aged 14 years. The loop projected from the center of the disc, and the anterior tip was seen clearly with + 4 D. on the right side and + 2 on the left. The eyes were otherwise normal and the vision with a low + cylinder equaled 5/5 in each eye.

Bilateral Facial Paralysis.

Dr. Buchanan also showed a case of bilateral facial paralysis involving brows, lids, cheeks and upper lip, associated with insensitive corneae. Lower lip and chin were not affected. The muscles were atrophied and one-third normal, but the corneae were covered. The patient, a girl, aged 13 years, is one of a family of fourteen children, nine of whom are dead; three of those living having some form of paralysis. The ophthalmoscope showed the discs well defined and vessels normal. Hearing unimpaired; Wassermann negative; X-ray of the chest revealed no pathology; X-ray of the head showed inner table of skull atrophied, with the convolutions clearly defined, with frontal suture spreading. The differential blood count revealed the following: red cells, 3,999,000; white cells, 6,900; hemoglobin, 70%; small lymphocytes, 43; large lymphocytes, 6; polymorphonuclear leucocytes, 51%. The vision with correcting lenses = 5/6 in each eye. Dr. Wilson made a neurologic examination and believes the case one of muscular dystrophy, familial in type.

Ciliary Tuberculoma.

DR. BURTON CHANCE exhibited a case of tubercle of the iris, in a young girl of 11 years of age, who had come under his observation late today. The disease had been noticeable in only the past few weeks; it was painless and had come on without any known cause. There are several masses of various sizes on the iris, the largest covering the inferonasal third, blocking the angle and pressing on the cornea. Besides miliary nodules on the face of the membrane there are four others of considerable size on the larger circle, and one distinct mass on the small. There is distinct punctate keratitis, with marked ciliary injection.

Proliferative Retinitis.

DR. L. WALLER DEICHLER exhibited a case of proliferative retinitis which he brought before the Section because of the blood vessel proliferation in the exudates themselves, transforming them into connective tissue structures.

The patient, a man, aged 40 years, reported to Dr. Pontius' service at Wills Eye Hospital, January 26th, 1925, and gave a history of imperfect sight for one year. Vision O. D., 20/30; O. S., 20/40. The lids, lacrimal apparatus, corneae and anterior chambers were normal. Pupils equal, and prompt in reaction. Tension normal. Under homatropin, the right eye showed small pinpoint opacities on the posterior surface of lens, otherwise the media were clear. Disseminated choroiditis with areas of pigment heaps and atrophy above and to nasal side above the disc; temporal half of nerve pale. In the left eye were large sheet like opacities with areas dense white in color, and a hole in the center thru which the fundus can be seen, with guy ropes and new vessel formation, and fine branching of vessels in the sheets; also a large area of choroiditis with atrophy and pigment heaping up and in from the disc. Laboratory and blood analyses negative. No history of any injury to the eye. The fields were taken by Dr. Plumer, interne at the Hospital.

Exophthalmos Due to Metastatic Osteosarcoma.

Dr. Frederick Krauss reported a rare case of bilateral exophthalmos due to a metastatic melanotic, round cell sarcoma, probably originating in the adrenals. The symptoms began with distress in walking, developing into a paraplegia about three months later, almost coincident with an increasing exophthalmos. The bilateral exophthalmos lasted about three months, gradually resulting in dislocation of the eyeball. The eyegrounds were normal for several months when optic atrophy slowly appeared, probably caused by the prolonged stretching of the optic nerve. The cornea slowly melted away as in keratomalacia, about three weeks before his death. The patient's intellect aside from deafness and blindness was normal. At postmortem, the entire interior of the skull, the external layer of the dura and the orbit showed new bone formation in the shape of innumerable crypts and stalactites, with the interspaces filled with round cell soft sarcomatous masses. The ribs, vertebrae and femur, as well as the liver, left adrenal gland and left kidney, contained sarcomatous masses.

Endothelioma of the Pituitary Body.

Dr. Wm. F. Bonner (by invitation) presented a case of endothelioma of the pituitary body with the following interesting features: (1) Normal field of vision in right eye, and atypical field in the left eye at first, later assuming bitemporal hemianopsia; (2) Normal physical examination; (3) X-ray showed absorption of sella turcica; (4) Diagnosis of neoplasm of the pituitary body by Dr. Charles H. Frazier, who did a transsphenoidal operation; (5) Diagnosis of section made by Dr. Allen J. Smith as endothelioma; (6) Improvement of vision and field in right eye; none in left eye.

Gonioscopy and Its Clinical Applications.

Dr. M. Uribe-Troncoso, of New York, (by invitation) read this paper published in full (See A. J. O. p. 433), describing a new instrument.

Discussion. Dr. H. Maxwell Langdon said that he was interested particularly in Dr. Troncoso's statement that the Gonioscope showed atrophy of the ciliary processes in the case where iridectomy had been successfully performed, but no atrophy in the case of unsuccessful trephining. He inquired of Dr. Troncoso if atrophy of the ciliary processes allowed better filtration. If this were true it would appear that iridectomy is desirable. As iridectomy has always been an operation which tended to restore the normal physiologic course of the aqueous, whereas trephining created a new channel for its exit from the eye, the size of the ciliary processes would apparently therefore make little difference.

THE NASHVILLE ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY

Chairman, Dr. Robert Sullivan.

June 15, 1925.

Hereditary Luetic Chorioretinitis.

Dr. Herschel Ezell presented the following case: On June 11, 1925 Miss M. E. M. age 16 years, came complaining of headaches and moving spots before her eyes, present when in a bright light. No history of tuberculosis or lues in the family. Father has recently had paralysis of right arm. Patient had most of the diseases of childhood. The ocular symptoms had been present for about three months and had been worse for the past month. She had been out of school for about a month, as studying increased the headaches and made her very uncomfortable. The tonsils were removed six years ago.

The vision of each eye was 20/20. The pupils were dilated with homatropin and each fundus was found to be covered with many round and irregular areas of chorioretinitis. The majority of these areas were black, but there were a few white ones. They were scattered over the entire fundus except in the yellow spot region, which, however, was being dangerously encroached upon. All of the retinal vessels passed over and in front of the affected areas. No hemorrhage could be found in either eye.

Wassermann test made June 12th was positive. The patient has Hutchinson teeth. No pathology in nose, throat, or ears. Diagnosis, choriore-

tinitis disseminata. The patient is now under antiluetic treatment. There is no change in her condition as yet. The inunctions were begun on June 11th and the first injection of salvarsan on June 13th.

Discussion. Dr. Eugene Orr thought we were too prone to stop our examination when we get a positive Wassermann. While antiluetic treatment should be actively instituted in cases of this type, yet on the other hand, any other possible cause should also be looked for. Even tho this patient was syphilitic, he did not think antiluetic treatment sufficient. He recalled two cases of central choroiditis in particular which were promptly relieved by the removal of the tonsils.

Dr. Robert Sullivan recalled a case of severe iritis in a patient who had a four plus Wassermann. The usual treatment of atropin, dionin, and antiluetic remedies gave no relief whatsoever. The pain became so severe as to require morphia for relief. Upon leaving off all treatment and removing the tonsils the iritis promptly subsided and the patient now has perfect vision. In this particular case the iritis had no relation to the lues.

Dr. Ezell (closing) said the chief point of interest in this case lies in the age of the patient rather than in the disease itself. This is one of the very few times in which he had observed this condition in one so young. The upper air tract and the teeth are healthy. The tonsils have been removed. In the presence of a four plus Wassermann, Hutchinson teeth, and history of paralysis in the father, he could not help but believe the condition was due to lues.

Retinitis Proliferans.

Dr. Robert J. Warner showed the following case: R. H., male, colored, age 39. Right eye, poor vision since January, 1925. Five days after first noticing dimness of vision the patient had only light perception. He was sent to the hospital where he remained for one month, receiving while there several doses of salvarsan. The right eye at this time showed extreme optic neuritis and retinal hemorrhage. Left eye has been bad since childhood, as the eye became crossed. Right eye: Vision 20/70. External examination negative. Fundus shows newly formed blood vessels above the disc, which seem to project into the vitreous.

Left eye: Vision 20/200. External and fundus examination negative for extreme hyperopia. Diagnosis: Right eye: Retinitis proliferans.

Discussion. Dr. Herschel Ezell said it was interesting to note a fresh hemorrhage in the presence of the proliferating process. There could be no question as to the diagnosis.

Dr. Robert Sullivan saw this patient in February while on service at the hospital. The diagnosis at that time was neuroretinitis. He did not then have the retinitis proliferans.

Dr. Warner (closing) said in his experience it was quite rare to see unilateral retinitis proliferans.

Flap in Cataract Extraction.

Dr. E. B. Cayce demonstrated the result of the Verhoeff flap in Mrs. E. W., a white woman 62 years of age. The operation was done with the Derby modification of the Verhoeff flap and the lens removed in the capsule with the Kalt forceps.

Discussion. Dr. Cayce had done this operation fourteen times. In four cases he had been able to get the cataract out in the capsule; in only two cases had needling been necessary; and in only one case was there any loss of vitreous. This loss of vitreous was due to the fact that the technic had not been previously worked out and there was some confusion about cutting off the iris. He does not believe, however, that the amount of vitreous lost would interfere seriously with the result.

Dr. Eugene Orr thought the only objection he would have to this operation would be that with a number of sutures lying about,—if anything happened that the eye should be closed, he would be afraid of pulling the wrong suture.

Dr. Fred Hasty considered with untrained assistants, this was a most dangerous operation on the eye. With trained assistants it is the operation of choice. Operating, however, as most of us do with different assistants, he would not recommend the operation at all. He would rather hold to the old technic where the surgeon does all the

manipulation of the eye himself. He does not know of anything more risky than to have a finger or hand moving about an eye without a definite idea as to what is to be done. In doing this operation one should have the same assistant all the time in order to have successful results.

Dr. Robert Sullivan saw Dr. Cayce do this operation and personally was delighted with it. With trained assistants he saw no reason why it should not be a beautiful technic for cataract extraction. His objection to it would be the amount of time consumed in the preliminary steps. However, he would try this technic, and believed a suture could be worked out where one could, if necessary, in one move replace the flap and close the eye. He had used the corneal suture, but believed it easier to do the extraction than to place the suture.

Dr. Cayce thought the personal equation plays a part in selection of this operation for the reason that he had always had difficulty in making the section. It has always been hard to come out at the right place in making the von Graefe flap.

Tumor in the Orbital Cavity.

Dr. E. L. Roberts showed the following case: L. H., a white female 39 years of age. Six or seven months ago the left upper lid became inflamed as if from an oncoming stye or Meibomian cyst. This was accompanied by a mild conjunctivitis. The eye was otherwise normal in size and appearance and the vision was not impaired. Neosilvol was prescribed for the conjunctivitis, and after a week's time the inflammation in the lid subsided. Palpation, however, revealed a mass in the region in front of the location of the lacrimal gland. Since that time the eye has shown no inflammation but there has been a gradual enlargement of the mass until at present there is pronounced ptosis. The mass is very distinctly felt but is not hard enough to justify the conclusion that it is a bony growth, nor does the tumor in its development justify that conclusion. The left orbit is negative by X-ray.

Discussion. Dr. Robert J. Warner had a case similar to this in which he excised the best part of the gland and the pathologic report was mixed tumor of the lacrimal gland. The tumor was removed without any damage to any of the muscles. This was a year and a half ago. The patient has been observed two or three times since and the eye is normal in every respect.

Fred E. Hasty,
Editor.

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY

July 14, 1925.

Thrombosis of Branches of Retinal Vein.

Dr. E. C. Ellett reported two cases. Mrs. S. had been under observation for many years and was known to have good vision with her glasses. In May 1925, then aged 47, the right eye became blurred and uncomfortable. Vision was 15/70 unimproved. A fan shaped area of retinal hemorrhages was seen in the area up and out drained by the superior temporal branch of the retinal vein. Her physician reported that her blood pressure had been high for six years, varying from 155 to 190 systolic. Under treatment, consisting of iodides and diet, the vision was 20/30 on July 2nd. The fundus looked about the same.

Mrs. G. aged 44, seen June 17 complaining of poor vision in O. D. for two months. The vision was 10/200. The fundus picture was the same as in the other patient. Blood Wassermann negative, blood pressure 108 S. Tension normal. On iodides the vision had improved to 15/40 on July 7th. The condition is well illustrated in a plate from Oeller's Atlas which was shown.

Foster Moore in a study of 62 cases, found that when a branch of the retinal vein was affected it was the superior temporal branch in 70% of the cases. He knows no satisfactory reason for this. The chief cause of thrombosis is arteriosclerosis, but this was not present in the second case. The immediate cause of thrombosis is the obstruction caused by the crossing of a thickened artery. The hemorrhages gradually fade away until no sign of them can be seen.

Charles D. Blassingame,
Secretary.

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EDITORIAL STAFF

EDWARD JACKSON, Editor,
217 Imperial Bldg., Denver, Colo.
M. URIBE-TRONCOSO,
226 W. 70th St., New York City.
MEYER WIENER,
Carleton Bldg., St. Louis, Mo.
CLARENCE LOEB, Associate Editor,
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CASEY A. WOOD,
7 W. Madison st., Chicago, Ill.
HARRY V. WÜRDEMANN,
Cobb Bldg., Seattle, Wash.

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JEAN MATTESON, ROOM 1209, 7 West Madison Street, Chicago, Ill.

SLIT LAMP MICROSCOPY (BIOMICROSCOPY) IN OPHTHALMOLOGY

Microscopy of the living eye, as is always the case with new methods, could not escape the enthusiasm and zeal of its adherents on one side, and the criticisms, more or less severe, of its opponents on the other. The former hailed its appearance as the dawn of a new era for ophthalmology, and perhaps for general medicine. The latter saw in it only an improvement in the technic of the examination of the anterior segment of the eye, which does not give better "practical" results than the ordinary loupe and oblique illumination. They emphasize that results with this method have been purely speculative and mostly in the domain of scientific research. Moreover the instruments are so expensive, the technic of its use so difficult to master, and the interpretation of the findings so uncertain in several cases, that microscopy of the living eye, they assert, will be probably confined to large clinics and hospitals, and purely as a laboratory method of diagnosis, with a trained personnel.

Fortunately the series of courses given recently in several cities of this country, by Prof. Koeppe and Mr. Basil Graves, have not only reawakened the interest of the ophthalmologists, but shown conclusively that the technic of the examination is not so difficult to master as it at first would appear, and that the diagnosis and, as a consequence, the treatment of many morbid conditions will be greatly benefitted by the use of the slit lamp.

Let us consider first which name should be applied to this new method. The two principal parts of the instrument; the Czapski corneal microscope and the Gullstrand slit lamp illumination were devised independently, the former many years before the latter. Even when used together for the examination of the cornea the possibilities of the new method were not recognized, until Koeppe, Vogt and others gradually built up a new technic, and came to new and striking results, by the microscopic examination of the whole anterior segment of the living eye and even of the fundus itself.

Whereas we were before restricted to study pathology only in dead and stained tissues, and generally in an

advanced stage of pathologic change, the new method unexpectedly made possible a perfect examination under great magnification of the living tissues of the eye. For this reason the old names of slit lamp examination or Gullstrand method must be supplanted by the more comprehensive one of microscopy of the living eye. As this is too long, Dr. E. Jackson has suggested the designation of *Biomicroscopy* which wholly and satisfactorily describes it, altho it does not mention specifically the eye. Ophthalmo - bio - microscopy being too long and oculomicroscopy leaving aside the important concept of life, it would be preferable to use the shorter term of biomicroscopy as proposed by Dr. Jackson.

In the writer's opinion the biomicroscope is, after the ophthalmoscope, the most far reaching discovery made towards the advance of ophthalmology. The examination of the fundus in the beginning was considered only as a scientific curiosity, and very few could foresee the enormous development that this new branch was to have, with its future applications to general medicine.

The biomicroscope requires long and careful training, just as the ophthalmoscope does; first, in getting a clear image of the spot or lesion examined, and second for the correct and accurate interpretation of the changes; eliminating as much as possible the personal equation of the observer.

The results obtained to date with the biomicroscope can be divided in two classes: 1st, research work to promote and advance our scientific knowledge of the physiology and pathology of the eye; and 2nd the application of this new knowledge to clinical purposes, improving our conception of diseases, making finer and more accurate diagnoses, and consequently increasing our opportunities for better therapeutics. The second aim is undoubtedly dependent on the first and, as it always occurs in science, purely speculative matters may at last prove of incalculable value for the resolution of practical problems.

Biomicroscopy is still in its infancy, but is full of promises. New improvements in the apparatus and the simplification of the technic, will in the future bring more and more this method into the every day practice of the ophthalmologist. It will be impossible in this editorial to even intimate the most salient new facts found by the biomicroscope. Everyone, simply perusing the Atlas of Vogt, or the books of Koeppe and Koby will be surprised at the large amount of new facts, new symptoms, and new interpretations of old facts they contain. The pathology of the cornea has been enriched a great deal. The detection of thickness and accurate localization of lesions at different depths has been made possible with the narrow slit. The difference between folds and ruptures of the Descemet and Bowman membranes has been made clear. The whole chapter of the precipitates on Descemet's membrane either normal or pathologic, has been enlarged and systematized. It is possible to differentiate a clump of leucocytes from red cells, pigment cells, or detritus. It is remarkable how easily and how much earlier they can be observed in the course of many unsuspected cases of iridocyclitis. Recently Dr. Malling, who has studied many cases of what was considered primary glaucoma, was surprised to find precipitates of an inflammatory origin on the back of the cornea.

Our knowledge of many types of keratitis corneal degenerations, or dystrophies have greatly benefited by biomicroscopy, not only for the detection of new symptoms and new interpretations, but for a better diagnosis. The iris presents a superb view with the biomicroscope. Exudations, nodules, pigmentary lesions and atrophies are remarkably seen. Koeppe, who has minutely described the situation and characteristics of the nodules, attributes to them a great etiologic significance. He claims that, when formed in the pigmentary edge of the pupil, they are due to tuberculosis, sympathetic ophthalmia, lues or lepra. The nodules are also found in the stroma of the iris and may be due to the three above mentioned diseases. Other authors, however, do not attach to them so great an etiologic significance. Ab-

normal pigmentation, depigmentation and atrophy are clearly observed. Traumatic lesions, ruptures, foreign bodies, cysts, etc., are easily differentiated.

The examination of the lens has given to Vogt very important data. It is no exaggeration to say that new anatomic and pathologic facts have entirely changed our conceptions of many types of cataract. The slit illumination gives a very sharp optical cross section of the lens, on which all the layers, from the anterior to the posterior capsule, are clearly visible, as in a microscopic section. A new nucleus, the fetal nucleus is visible, and also the Y λ which forms its limits on either side. The adult nucleus, formerly called senile nucleus, can be sharply distinguished from the cortex, which it has been found, increases continually in thickness during life. The process of the formation of cataract can be studied minutely from the very beginning, sometimes when there is not the slightest clinical symptom of it. The difference between senile cataract and the complicated or pathologic, is very striking with the biomicroscope.

The study of the normal and the pathologic vitreous makes one of the most fascinating subjects. Instead of a clear transparent medium, the vitreous appears as a close network of vertical and horizontal connective fibers of a whitish color, separated by dark interspaces. The whole framework moves with the displacement of the eye. Small opacities, located especially in the crossing of the fibers and of a white color, become more marked in advanced years. Pathologic conditions are beginning to be minutely studied in the vitreous, and no doubt in the future, many important changes will be found in iridocyclitis, chorioretinitis, glaucoma and many other diseases.

M. U. T.

OSLER AND AN OPHTHALMIC LIBRARY

A real treat is in store for every doctor who reads Harvey Cushing's biography of Sir William Osler. Even if the reader did not have the wonderful privilege of knowing Sir William personally, he cannot but be delighted with this fascinating account of this dean of the profession. The material is largely from the subject's voluminous writings and correspondence, dealt with in a most interesting manner. Osler was so much in the van in the development of medicine for fifty years, during an era of most astounding advances in this art, that to read his biography is to review the history of medicine for this period.

Always an instigator of others, one of his most important contributions was the rejuvenation of interest in medical libraries. Not only did he leave a marvelous personal collection of books and MSS., but also stimulated the acquisition of new material and the cataloging of old in every city in which he was located.

His life should be of especial interest to ophthalmologists as it was their specialty which he chose first to practice but circumstances changed his plans. Incidentally Cushing records that the first entry in his account book was 50 cents collected for removal of a foreign body from the cornea. Sir William retained his interest in ophthalmology and I am sure that if he were to address today a group of specialists in that branch, one of the messages which he would give would be that there should be a central ophthalmologic library for the United States, a place where rare ophthalmologic books and MSS. could be filed for historical interest and for reference.

Fairly complete files of current ophthalmic literature are to be found in many cities but if one particular library, or section of a library, were known to be set apart for rare books relating to the specialty, it would soon become the recipient of interesting and valuable incunabula and MSS. Often upon the death of a physician there is no one to whom he desires especially to bequeath his library while if he knew that there were an institution eager to receive his books and ready to put them to the best use, he would be glad to leave them to such a library.

That a center of this sort would be appreciated by ophthalmologists is evident from the interest shown in an

exhibition of a private collection a short time ago at a meeting of a national society. Fully two-thirds of those attending the convention examined the books tho they were housed in a distant building. If the fruits of one man's effort can excite this much interest surely a national collection would be of much greater interest and would give the opportunity of passing many hours of profit and pleasure in its study. L. T. P.

THE JOURNAL AND YEAR BOOK.

The JOURNAL dinner meeting, held at Chicago, in October, was marked by very free discussion of certain points of policy for the conduct of the JOURNAL and Year Book. All who spoke on the subject argued that the subscription price for the two should be raised to fifteen dollars per year, as originally proposed when the merger of journals was made eight years ago. It is certain that the natural expansion of the JOURNAL in the direction of increasing the original communications and the abstract department cannot be carried forward on the old subscription price, without risking the sound policy of keeping expenditures within the limits of income.

However, the Directors are conscious that the enthusiasm of those who attended this meeting might be greater than that of many subscribers who were not there. They have fixed the price for the two publications at twelve dollars per year. But until December 31, 1925, subscriptions for 1926 will be received at the old price, eleven dollars. The number of advertisers continues rather steadily to grow, there still are many ophthalmologists who could take the JOURNAL with advantage to themselves, as well as to other subscribers; and it is hoped the gain from these sources will make possible at least some needed advances in the coming volume.

THE AMERICAN JOURNAL OF OPHTHALMOLOGY is the cheapest ophthalmic journal in the world. This is possible because it has the largest circulation. But subscribers to it do not realize how cheap it is. With the cost of printing doubled, it costs less than one-third the price of the publications merged to establish it. Comparing it with the two other excellent ophthalmic journals now published in the English language: The A. J. O. and Ophthalmic Year Book, this year, furnished for each dollar of its subscription price 120 journal pages. Of its rivals, one furnished for each dollar, less than 60 similar pages and the other less than 50. If the price of this journal were doubled, the service it could give to its subscribers would be enormously increased; were it not that many would discontinue their subscriptions. But if the number of subscriptions at the present price were doubled, the gain would be even greater; since it would also increase the revenue from advertising. There are enough doctors interested in ophthalmic practice, in Canada and the United States, for each present subscriber to get one new one. Will you do it?

Another point on which there was general discussion and unanimous agreement was, that the abstract department was an extremely valuable part of the JOURNAL and should be extended. The idea of publishing the journal in the form of two volumes per year was broached. The gain would be reduction in the size to half the bulk of one annual volume, when the bound volumes were to be consulted. The expense of publication would not be increased, but the cost of having the volumes bound would be almost doubled. One subscriber stated he had the twelve annual numbers bound in two volumes, six months in each, and found the smaller volumes very convenient to handle for reading. But of course the second volume of the year always had to be consulted for the index. However, this need not be a disadvantage. Some publications put out, each ten years, a combined index; that is always more convenient to use than the indexes they publish in each volume. No change, however, in this respect, will be made at present.

E. J.

BOOK NOTICES.

Die Lehre Vom Raumsinn des Auges. Frans Bruno Hofmann, Prof. in the University of Marburg. Paper, 8vo., 672 pages, 154 illustrations. Berlin, Julius Springer.

This work has been published in two parts. The first appeared in 1920, the second in 1925. There is a bibliography of more than 1,500 titles, arranged alphabetically by authors' names; which has been brought up to date by appending in the second part 63 titles referring to part one. Except for this, each part includes the portion of the bibliography referring to subjects discussed in it.

Physiologic optics generally includes a good deal that is not usually considered as belonging to either physiology or optics. There are mathematics, physics, chemistry, and psychology all liberally represented in it. This teaching of the visual space sense is almost as indefinitely inclusive as the general subject of physiologic optics. This is apparent from a glance at the headings under which the visual space sense is discussed.

In the first part, 200 pages, are devoted to an introduction, and to relative localization in the plane of the visual field. Under this we have irradiation, 11 pages; and the resolving power of the eyes, 36 pages, 7 subheads. Then comes the delicacy of the optical space sense of height and breadth, 3 pages; the relation of space thresholds to the resolving power, 13 pages, and these relations for directions and angles. The recognition of size has 11 pages, and of outline, 12 pages; and form perception, with 6 subheadings, 38 pages. The remaining headings are: The influence of distance on localization in the visual plane, 22 pages; the space value of single retinal units, 26 pages; and the filling out of the blindspots, 8 pages.

The second part begins with the section on retinal correspondence, 44 pages; discussing the binocular field of vision, the determination of corresponding retinal positions, the horopter, visual directions, theory of correspondence and discriminations between impressions on the right and left eyes. Next come the eye movements, 92 pages, including the centers of rotation, Listing's law, the actions of the single eye muscles, the field of fixation; and the innervation of the eye muscles, with 5 subheads. The directions of localization, occupies 40 pages. Localization as to depth, 126 pages, includes relative and absolute localization as to depth, visual distance and apparent size, and halposcopy and stereoscopy. Visual movements and theory of form, occupying 55 pages; and the connection of the optical space sense with the general organism, 20 pages, complete the body of the book.

It is easy to recognize in each item of the list, a part of the territory that psychology has occupied, or is busily annexing to its own domain. It gives significance to a recent sentence regarding Helmholtz's Physiologic Optics:

"If his work were to be brought out now for the first time it would undoubtedly be called Phychologic Optics instead of Physiologic Optics—there is far more psychology in it than there is of physiology, and the psychology is (for the most part) of an extremely acute, as well as of a highly original kind." How complete this unity of psychology and physiologic optics is, appears in the opening sentence of the last section of this book, which may be freely rendered thus: "Our visual organ is inserted in the general organism for a threefold purpose: it guides us in the execution of our voluntary movements; it helps with other senses, to knowledge of the things of the external world, and supplies the foundation for the building up of our minds.

When a reader of German dips into a book on psychology he gets into deep water. But for such a treatise this book is rather easy reading. It deals more with concrete facts and less with speculation and imaginative arrangement of subjective phenomena, than some of the recent addresses in English, that have been given to the consideration of this borderland of physiology and psychology. It might

have gone a little more into the relations of orientation by vision with orientation by touch, muscular sense and thru the semicircular canals. But even a German Professor has to put the limit somewhere; and there is reason for gratitude that he has given so much of interest, so well stated, within the limits of a single work.

E. J.

A Preliminary Report on the Treatment of Interstitial Keratitis, by **R. Lindsay Rea,** M.D.; F.R.C.S., 4 plates (2 colored), 32 pages, Demy 8vo., price 2/6. H. K. Lewis and Co., Ltd., London, 1925.

This is a reproduction of a paper read before the Ophthalmological Section of the Royal Society of Medicine, and is based chiefly upon the author's study of 91 cases. The frontispiece shows the contrast between the profiles or a normal mother and her syphilitic daughter. Plate I shows two types of teeth seen in syphilitic children. Plate II shows three forms of interstitial keratitis of different degrees of severity, and Plate III shows the corneae of these cases as seen by the slitlamp. Plates II and III are in colors. There are 3 tables giving the results in untreated cases, delayed treatment, and treated cases. A short bibliography follows.

We cannot know too much about this disease and the author has made a valuable contribution to ophthalmology in this work.

C. L.

Medical Ophthalmology, by **R. Foster Moore,** O.B.E., London, England, Second Edition, American Imprint, P. Blakiston's Son and Company, Philadelphia, Pa., 1925.

A previous review of this admirable work prompts us to inspect this edition rather critically, questioning as we go, in just how far it may have admitted of correction or improvement. The author assists us in this regard pointing out that several entirely new articles have been added, namely those on Defects of the Visual Fields due to Lesions of the Temporal Lobe, The Normal Pupillary Reactions, Intracranial Aneurysms and Subarachnoid Hemorrhages, Encephalitis-Periaxialis, Primary Tumors of the Optic Chiasm, Ictero-Hemorrhagic Jaundice, Juvenile and Adolescent Forms of Cerebromacular Degeneration. This has entailed the addition of eight colored plates and a number of new black-and-white illustrations.

The author stresses in his preface the fact that no specific features, characteristic of the lesions ascribed to focal infections, have as yet been defined; and amplifies thereby that special consideration of teeth, tonsils and intestinal tract is not necessary. This is a most sensible viewpoint. Approaching the book with the curiosity of a novice we are pleased with the general appearance, the good paper, the clear type and the easily read text. We are especially pleased with the chapter on arteriosclerosis. The plates shown in this connection are especially good, altho it is doubtful if the photomicrographs will be given serious consideration, largely because the general reader is not likely to be interested in histopathology to the same extent as in ophthalmoscopy. The section on thrombosis of the retinal veins is most instructive. One cannot help but share the author's enthusiasm for the new section on intracranial aneurysms and subarachnoid hemorrhages, since it is truly a most interesting part of the book. It is doubtful if this is handled anywhere else in such a masterly manner. The chapter dealing with the ophthalmoscopic changes incident to blood disease will always be valuable, not only to the beginner but to the experienced ophthalmologist, refreshing in his mind, minor, but none the less important distinctions, that may have become hazy in the rush of daily routine.

In connection with nervous diseases ophthalmoscopic changes have always held a prominent place, and to have these systematically arranged for study, as is done in this little volume, is a great comfort. Our newer conceptions regarding disorders of nutrition and metabolism demand closer appreciation of all the manifestations in regard to the eyes. Consequently Chap-

ter V, dealing with this phase of ophthalmoscopy will be greatly appreciated by students and other workers along these lines. Renal retinitis comes in for considerable attention and rightly so, as we cannot know too much concerning this condition, especially in its early stages when it may be remediable. The ocular changes in pituitary diseases are especially well handled, as are also those of exophthalmic goitre. The specific infections and the drug toxemias are given appropriate consideration. The congenital conditions, as well as some of the novelties of ophthalmology, aid in making the book a complete survey of ophthalmoscopy. A comprehensive index is a prominent feature of the book. We have no hesitancy in adding our frank approval of the author's work to those that have appeared from other sources.

L. Webster Fox.

Conserving the Sight of School Children, a Program for the Public Schools. Report of Joint Committee on Health Problems in Education. Paper, 8vo., 56 pages. New York, National Committee for the Prevention of Blindness, 1925.

The reasons for this pamphlet are thus stated in the foreword by the Chairman of the Joint Committee, Dr. Thomas D. Wood of Columbia University: "The information concerning eyesight, and the methods of testing and conserving eyesight, while on different levels of simplicity or technical complexity according to the training and responsibility of those involved, viz., parents, teachers, nurses, doctors, ophthalmologists, should be in essential agreement. The purpose of this report is to supply to teachers, school officials and all others concerned with this problem, information, advice and practical directions which will promote the conservation of eyesight of all school children."

This joint committee was constituted by cooperation of the National Education Association and the American Medical Association to deal with health problems in education. It has had many meetings under the guidance of its chairman, who is a member of both associations. It has had the assistance of many of the experts of highest standing in America with reference to each of the problems it has reported upon. Its representations are founded on facts carefully ascertained, and its recommendations set for the matured convictions of leading ophthalmologists and educators.

This edition has been published by the National Committee for the Prevention of Blindness, for distribution among teachers and school authorities. Some readers may be startled and disturbed at the extent and importance of this subject, to which they have given no special attention. But they will find the essential experience, the purpose and aims of the two great national bodies, that are back of this movement, here set forth in clear direct languages, without sensational statement, or service of hidden selfish interests.

The plan and scope of the work is stated in Chapter I. Chapter II takes up the importance and extent of defective vision among school children. Chapter III describes the present practices in conserving the vision of school children; and Chapter IV, the approved practices in eye inspections. The preceding lead up to Chapter V, knowledge essential for the teacher, the school nurse and the school physician, in the conservation of vision; Chapter VI, duties of nurses and other trained nonmedical examiners in conserving vision; Chapter VII duties of teachers in conserving vision; and Chapter VIII, conservation of vision classes. Chapter IX, gives conclusions, recommendations, and administrative measures. Chapter X, states the standards for defective eyes and vision, and a brief list of references to literature of special interest in this connection.

The program for conservation of vision here outlined is a broad one, in strong contrast to the propaganda that has been elsewhere promulgated for the mere fitting of glasses, or the search for contagious diseases, especially trachoma, or the installation of "modern" systems of artificial lighting. Not that any of these special precau-

tions are useless; but that the care of vision, in connection with the education and development of the rising generation, is something more inclusive. As stated here the objectives are:

1. The detection and correction of visual defects.

2. The detection and treatment of eye diseases.

3. The establishment of special educational facilities for children who, after having had eye defects corrected or treated, are unable to work under ordinary classroom conditions.

Up to the present time the third of these items has been most neglected. But with the whole trend of medicine toward prophylaxis, it is easy to hope that such special care will be given to the crippled eyes that most need it, a class that has been furnishing much of the blindness of later life.

Written to present only the most important statements pertaining to conservation of vision, and sifted by the concensus of experts, this work contains little that is new to the ophthalmologist. But it is one that he can safely recommend to teachers, school authorities, school physicians, and nurses as a correct statement of facts and a sound guide to the proper care of the eyes during school life.

E. J.

The Treatment of Kidney Diseases and High Blood Pressure, by **Frederic M. Allen,** M.D., Pt. I, 210 pages. The Physiatric Institute, Morristown, N. J. Published by the Newark Printing Co., 1925.

When we consider the frequency of involvement of the eye in kidney disease and hypertension, the subject presented in this book is of great importance, altho the only direct references to the eye are the statements, that retinitis should always call for a salt free diet; and that glaucoma did not permit of a definite judgment in regard to this. Part I is a manual for physicians and patients. Part II, to be published later, will take up questions of anatomy, pathology and complex or obscure problems of etiology. The subject matter is divided into 6 chapters, followed by a good index. Chapter I, Incidence and Mortality, 8 p.; II, Etiology, 7 p.; III, Prophylaxis, 3 p.; IV, Signs and Symptoms of Renal-vascular Disease, 24 p.; V, Prognosis, 5 p.; VI, General Treatment, 17 p.; VII, Diet—Introduction, 3 p.; VIII, Protein Restriction, 7 p.; IX, Salt Restriction, 24 p.; X, Laboratory Procedures—Introduction, 10 p.; XI, Urinalysis, 7 p.; XII, Blood Analysis, 31 p.; XIII, Principles of Diet, 20 p.; XIV, Recipes, 21 p.; XV, Menus, 11 p.; XVI, Food Tables, 8 p.

C. L.

ABSTRACT DEPARTMENT

Reprints and journal articles to be abstracted should be sent to Dr. Lawrence T. Post, 520 Metropolitan Building, St. Louis, Mo. Only important papers will be used in this department, others of interest will be noticed in the Ophthalmic Year Book.

Abramovicz, I. Ocular Injury Caused by Liquid Ammonia. Brit. J. Opth., May 1925, vol. 9, p. 241.

This is the history of an uncommon ocular injury with a peculiar clinical course and unusual occurrence. The eyes were accidentally flooded with a 10% solution of ammonia while the patient had fainted in a dentist chair. The following day the lids were red and swollen. There was mucopurulent discharge and the conjunctiva was edematous. The right cornea was lusterless but the epithelium intact. Part of the left cornea and sclera showed loss of substance. Three weeks later hypopyon and perforation having developed the eye was eviscerated. The conjunctiva of both eyes was injected four months after injury. Ammonia absorbing water dissolves membrane and fuses into a homogeneous mass. The secondary relapse is due to the insidious destructive action on the deeper corneal layers. Prognosis should be guarded.

D. F. H.

Poyales. Insulin in Ophthalmology. Arch. d'Opht., 1924, 41, pp. 207-216.

The author discusses in detail a case of mild diabetic retinitis which devel-

oped into a severe hemorrhagic neuroretinitis while the patient was under treatment with insulin. Study of the retina by means of the corneal microscope with the Koeppe contact glass revealed marked degeneration of the walls of the retinal vessels with extensive extravasation of blood into the retinal tissues. Poyales believes that the retinal lesions are not the result of the diabetes but are the result of vascular degeneration typical of chronic interstitial nephritis. He considers that diabetics with retinitis are really nephritics with hyperglycemia and glycosuria. He thinks that in these cases, reduction of the sugar by means of insulin serves only to increase the toxic effects of the retained nitrogen products on the retina. This, he believes, is demonstrated by the increase of the vascular degeneration in the retina while the sugar content of the blood and urine is being reduced. He, therefore, deprecates the use of insulin in those diabetics having retinal lesions.

It is different, he feels, in those cases where surgery is indicated in which the eye lesion is not diabetic or nephritic in origin. In senile cataracts occurring in diabetics, the use of insulin is valuable in the preparation of the patient for surgery as the reduction of the sugar content of the blood and urine increases the organic defenses of the patient and makes healing more rapid. If the cataract is complicated by diabetic nephritic fundus lesions, however, the use of insulin is not of value and the case should not be operated on if the blood urea, uric acid, and creatinin are high.

The author thinks that the use of insulin is of value in the purely diabetic ocular manifestations such as paralysis of accommodation. He cites a case of this condition which improved under insulin therapy. H. P. W.

Cruickshank, M. M. Phacoerisis; Observations on the Technic, with a Report on 115 Consecutive Cases. Brit. J. Ophth., July, 1925.

The author describes in detail the erisiphake and vacuum apparatus employed. The erisiphake used has a 5 mm. suction cup devised by Greene. The vacuum pressure is obtained by a fixed mercury chamber and a mercury chamber which is raised and lowered on a rachet. The plan of preparation of the patient is to instill 1% silver nitrat and 1% atropin the day previous. Three hours before operation a second drop of atropin; one hour before operation an injection of ¼ gr. morphia is given. Anesthesia is obtained with four instillations of 4% cocain and a subconjunctival injection of cocain-adrenalin. A description of the operative procedure is given in the minutest details. Careful consideration of the good and also the defective phases of the technic are very lucidly given. A large clean corneal section is made with a conjunctival flap for the placing of a suture. By careful attention to every detail in dislocating and tumbling the lens, iridectomy was concluded to be unnecessary. The insertion of the erisiphake and application of the cup to the lens demands accuracy in every detail. An iris repositor is serviceable in preventing inversion of the edge of the cornea in passing the suction cup thru the wound. The iris is to be carefully avoided, this can be accomplished by edging one part of the cup under the iris. The erisiphake is held much as one would hold a von Graefe knife. The suction cup is placed on the lens and the vacuum pressure applied rapidly and firmly, otherwise, there is an inrush of air and the lens is in danger of being dislocated backwards. The nucleus of the lens is drawn forward and the diameter of the lens is lessened, thus rupturing the zonular fibers. The erisiphake is rotated by wrist movement thru an angle of 180°— to tumble and remove the lens, care being taken to avoid the posterior surface of the lens brushing the posterior surface of the cornea thus causing the lens to slip from the grasp of the cup. Toilet is completed, and bandage applied for six days, the eye again dressed on the eighth day and patient discharged on the tenth day. A summary of the results in 115 cases is given. An analysis of cases in which phacoerisis failed, the operation being finished by some other method; detailed analysis of eight unsuccessful

operations and a study of complications in all cases of completed Barraquer operations are discussed. The author asserts that the results obtained compare very favorably with those of other methods. Success is due to: 1. The simple extraction with or without iridectomy, care and no undue haste. 2. Use of conjunctival suture. 3. Use of subcutaneous injection of novocain in region of the external angular process. 4. Subconjunctival injection of cocain-adrenalin. 5. Subcutaneous injection of morphia. D. F. H.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. George H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph L. McCool, Portland, Oregon: Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. G. McD. Van Poole, Honolulu; Dr. E. B. Cayce, Nashville, Tenn.; Dr. Gaylord C. Hall, Louisville, Ky.; Dr. Edward D. LeCompte, Salt Lake City.

DEATHS.

Dr. George H. Smith, Hartford City, Indiana; aged fifty-two, died September twenty-eighth.

Dr. Henry M. Miles, Norton, Virginia; aged fifty-seven, was found dead in bed September eighth.

Dr. Daniel W. McDougald, Minneapolis; aged forty-eight, died suddenly of heart disease, September twenty-eighth.

Dr. Otis D. Stickney, Atlantic City; aged forty-seven, died September twenty-seventh from injuries received in an automobile accident.

SOCIETIES.

The Pittsburgh Slit-Lamp Society was formally organized October twelfth, for the purpose of promoting the study of slit lamp microscopy of the eye. Dr. William W. Blair, professor of ophthalmology, University of Pittsburgh School of Medicine, was elected president; Dr. George H. Shuman, secretary, and Dr. Adolph Krebs, treasurer. The society will meet monthly.

The annual meeting of the Medical Society of the State of Pennsylvania was held in the Capitol building at Harrisburg during October. A Symposium upon "Microscopy of the Living Eye" was participated in by Dr. Arthur J. Bedell of Albany, New York. and by Dr. Luther Peter and Dr. G. Oram Ring of Philadelphia. At the same meeting a Symposium upon "Some Observations of Ametropia and Heterophoria" was participated in by Dr. Howard Forde Hansell, Dr. Theodore B. Schneideman and Dr. C. E. G. Shannon all of Philadelphia.

The regular meeting of the Section on Ophthalmology of the College of Physicians of Philadelphia was held Thursday, October 13, 1925. Papers were read by Dr. Warren S. Reese: (1) "Exhibition of a Case of Tuberculous Keratitis;" (2) "Muscle Recession for Squint." Dr. William Zentmayer: (1) "A Case of Retinal Degeneration." (2) "A Case of Probable Pemphigus of the Conjunctiva." Exhibition of Cases. Dr. T. B. Holloway: "A Case of Pigmented Cyst Free in Anterior Chamber." Dr. L. Waller Deichler: (1) "Result of Ziegler Thru and Thru Operation for Traumatic Cataract." (2) "Retrobular Neuritis Followed by Optic Atrophy Due to Frontal Sinustitis." Discussion by Dr. Robert J. Hunter. Dr. Alfred Cowan: "Relation of the Aperture of the Eye to Ocular Function."

PERSONALS.

Dr. Edward B. Heckel has been elected president of the Pittsburgh Ophthalmological Society for the fourteenth consecutive year.

The Graefe prize awarded by the German Ophthalmologic Society was divided between Professor E. Seidel, Heidelberg, and Professor von Szily, Münster.

Drs. William H. Roberts, William H. Wimp and Howard V. Halbert of Pasadena, California, announce the removal of their offices to the Professional Building.

During the month of July Dr. Harvey J. Howard was captured by bandits and held for ransom. He was rescued after a battle between his captors and Chinese troops; and returned to Peking, October 7th. He came back in good health, altho thin and his appearance altered by a three months growth of whiskers. Dr. Howard is head of the ophthalmologic department of the Peking Union Medical College.

MISCELLANEOUS.

The first postgraduate course ever given in ophthalmology in China took place early this year. It was conducted in the Chinese language at the Peking Union Medical College. It was carried on under the direction of Associated Professor Tsing-Meu Ti assisted by four junior members of the staff. Nineteen physicians took the course and there were more applicants than could be accepted. The plan now is to alternate the customary Chinese New Year's course by giving it one year in English and the next in Chinese.

Current Literature

These are the titles of papers bearing on ophthalmology. They are given in English, some modified to indicate more clearly their subjects. They are grouped under appropriate heads, and in each group arranged alphabetically, usually by the author's name in **heavy-faced type.** The abbreviations mean: (Ill.) illustrated; (Pl.) plates; (Col. Pl.) colored plates. Abst. shows it is in an abstract of the original article. (Bibl.) mean bibliography and (Dis.) discussion published with a paper.

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